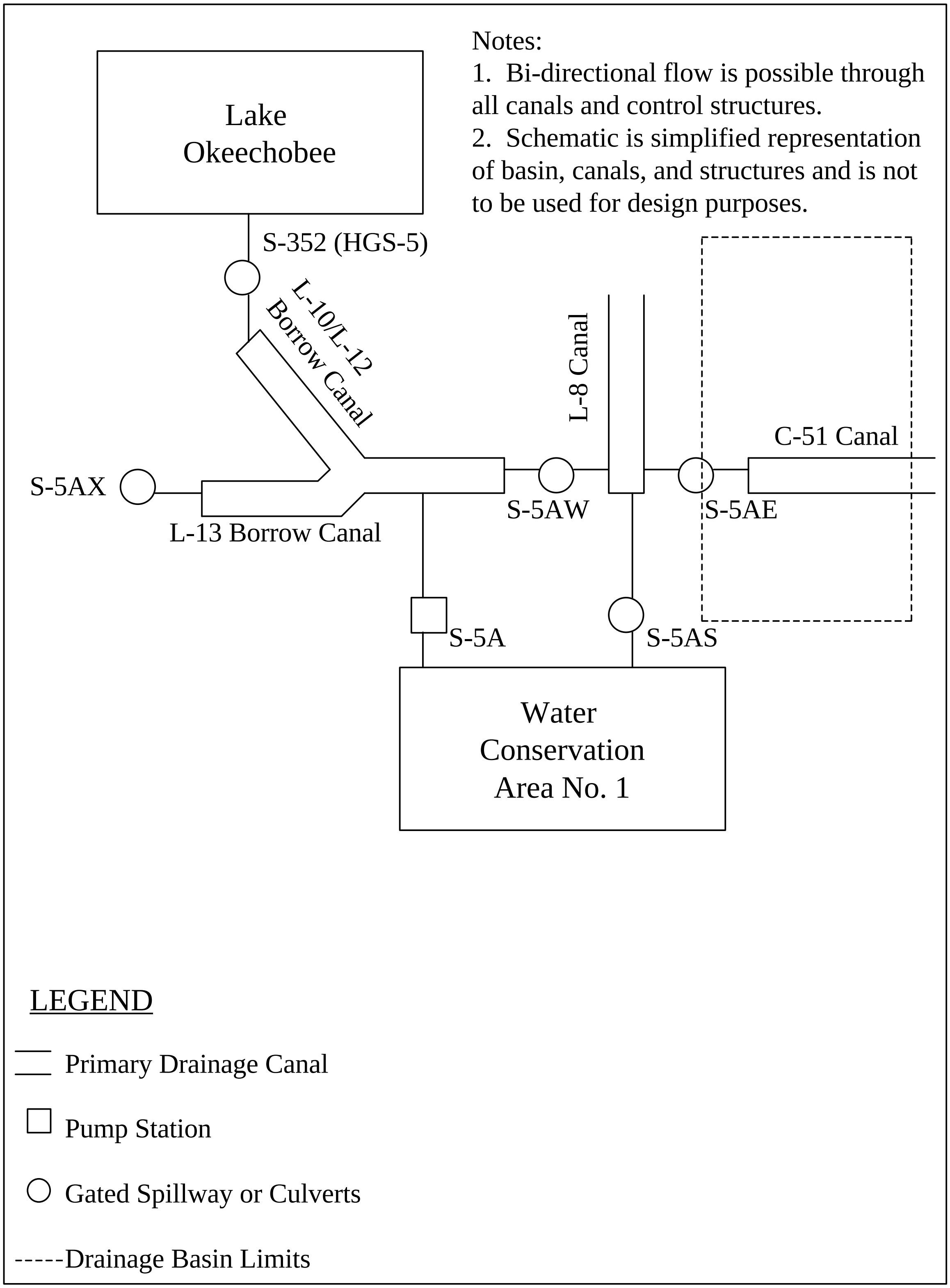
# Appendices to

Baseline Data for the Basin-Specific Feasibility Studies to Achieve the Long-term Water Quality Goals for the Everglades

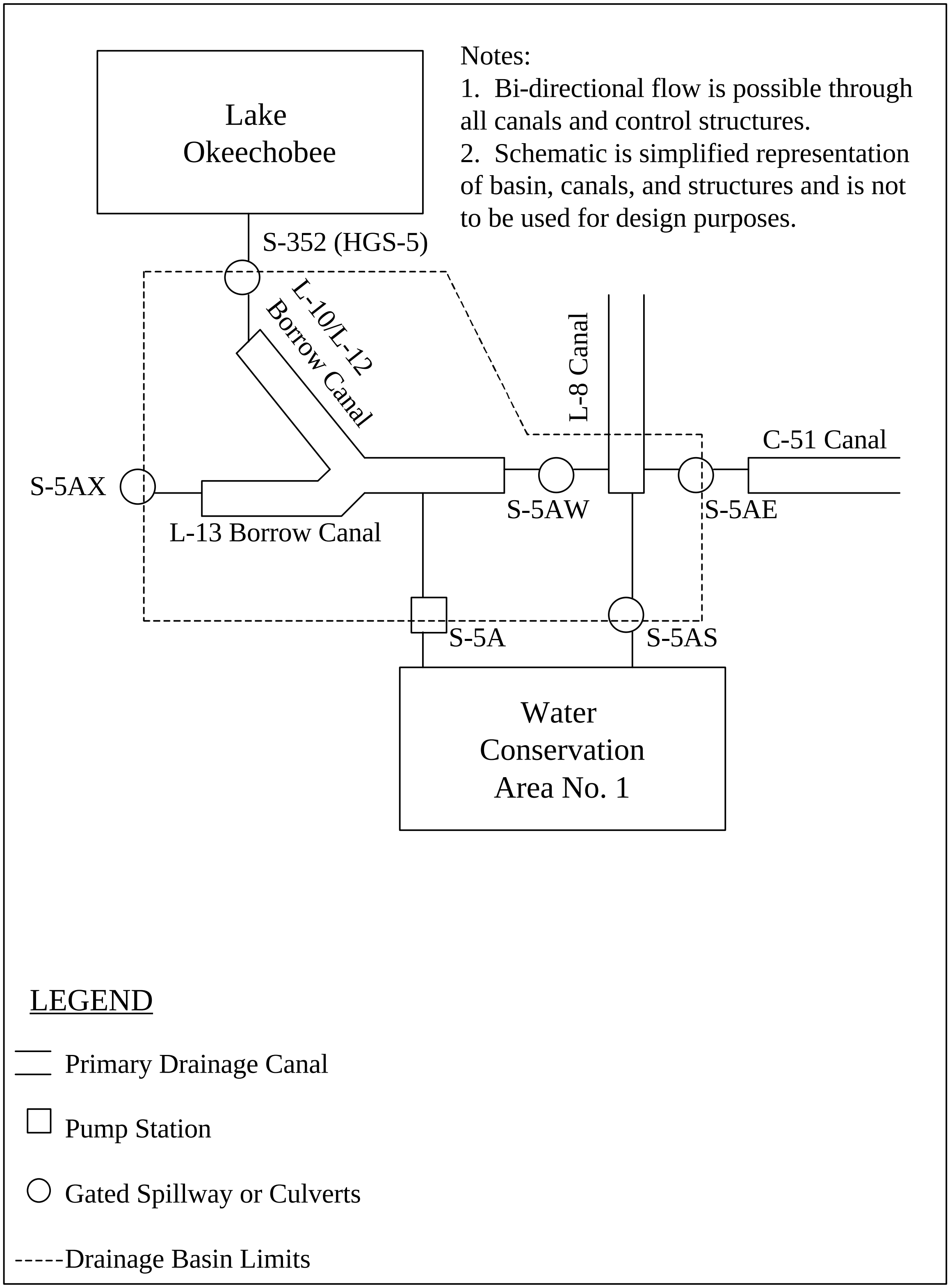
Prepared by the
South Florida Water Management District

Gary Goforth, Ph.D., P.E.
Tracey Piccone, P.E.
Environmental Engineering Section
Everglades Construction Project

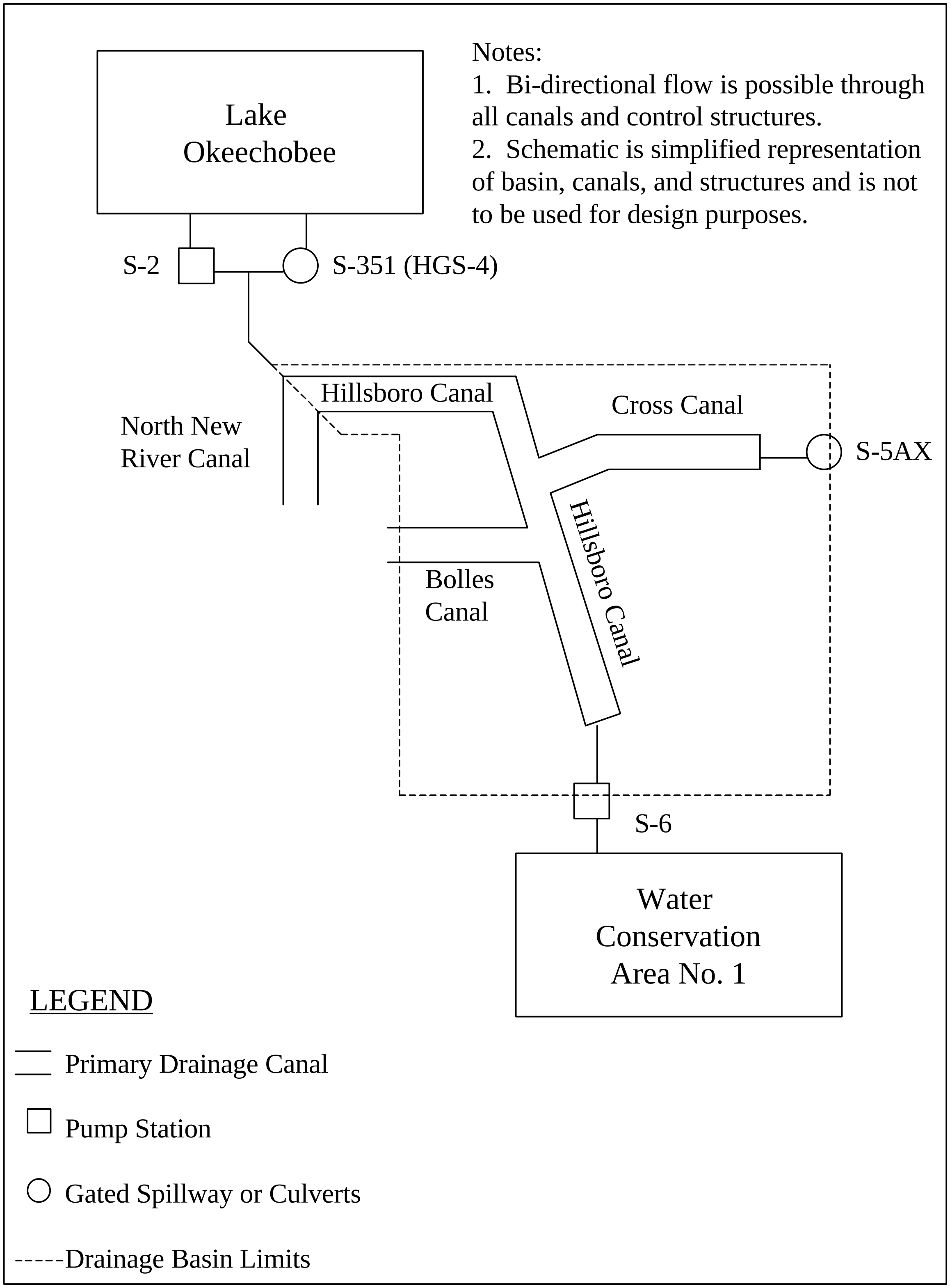
May 2001



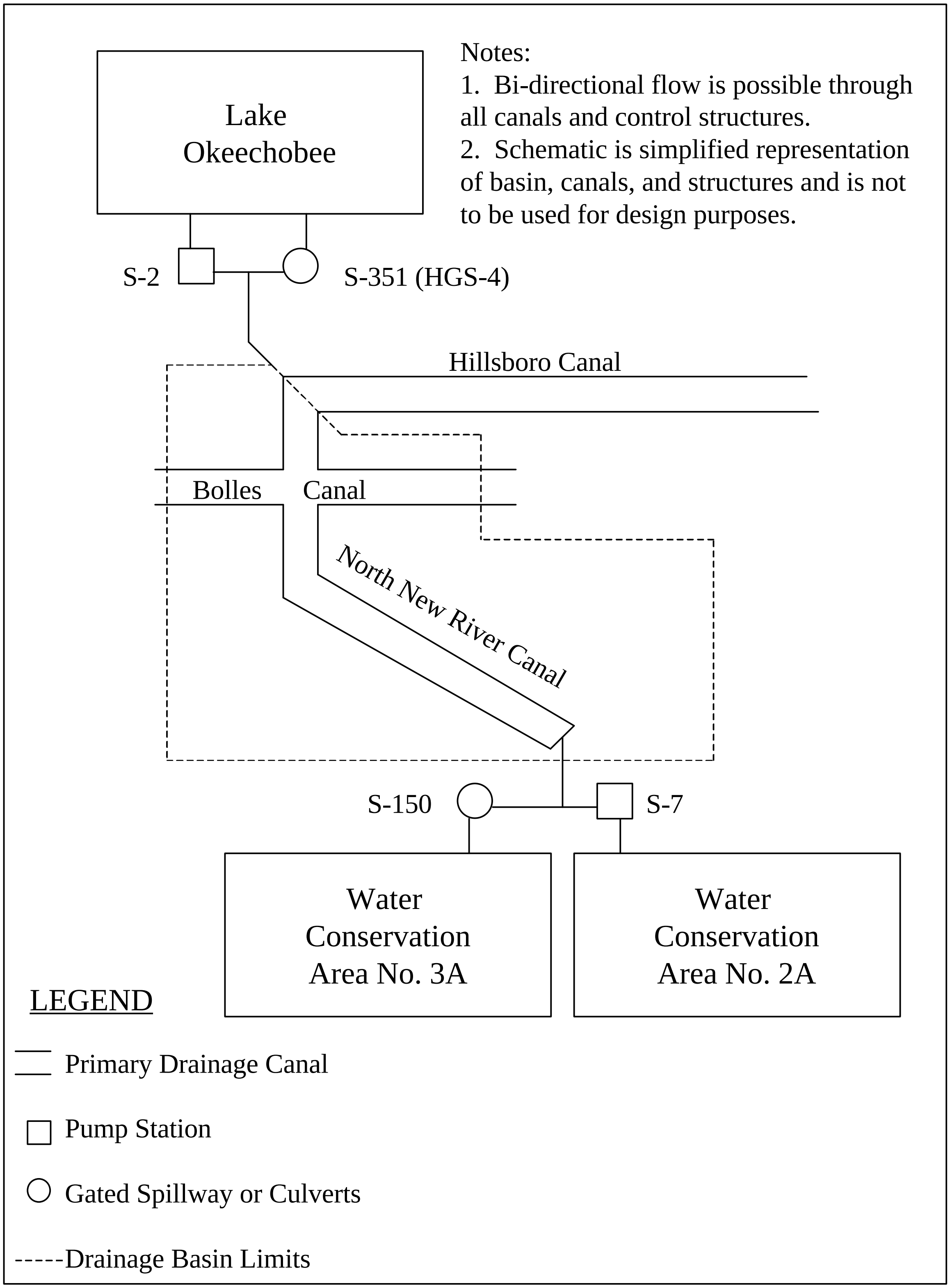

**Appendix 1-1. C-51W Basin Schematic**



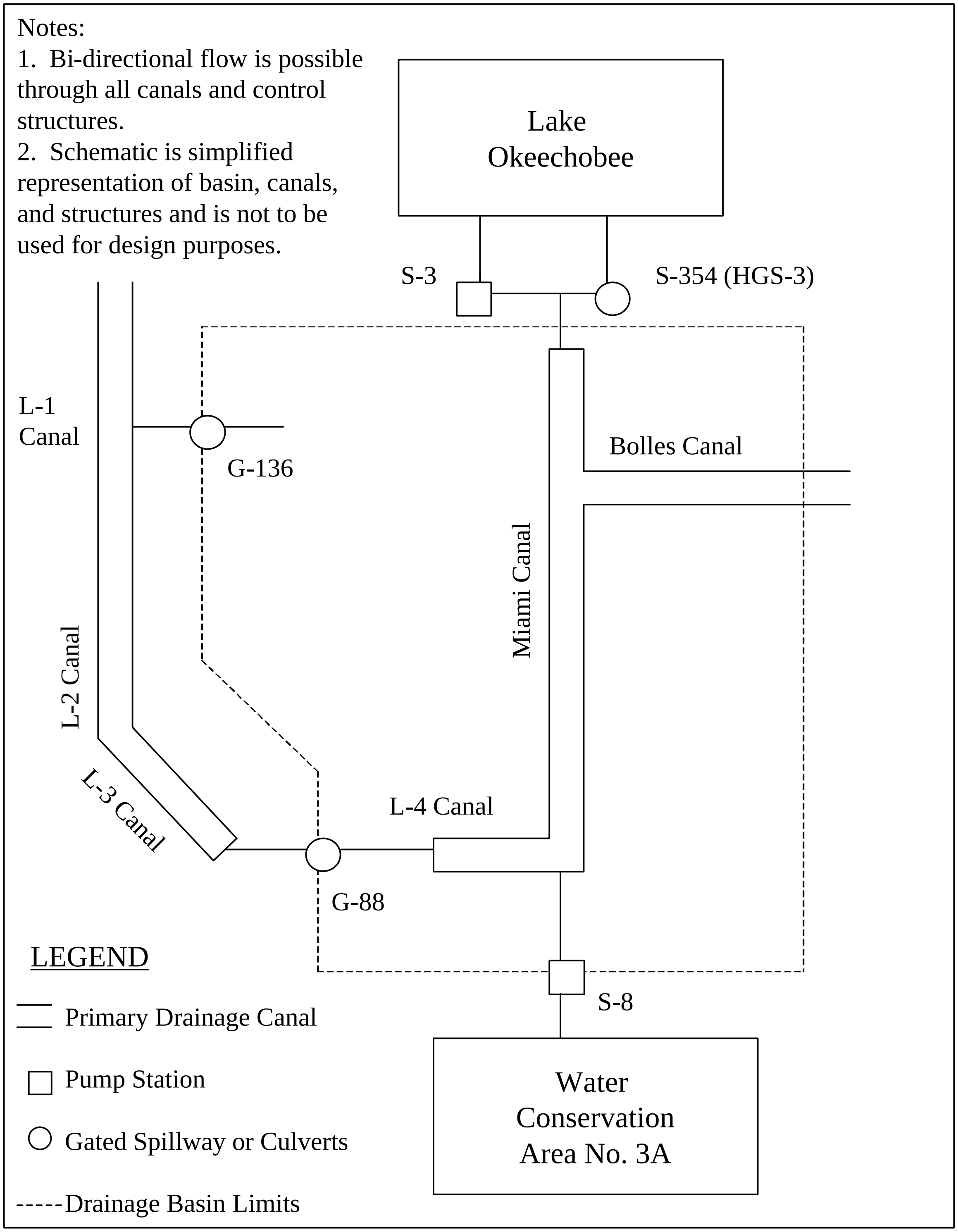

**Appendix 1-2. S-5A Basin Schematic**



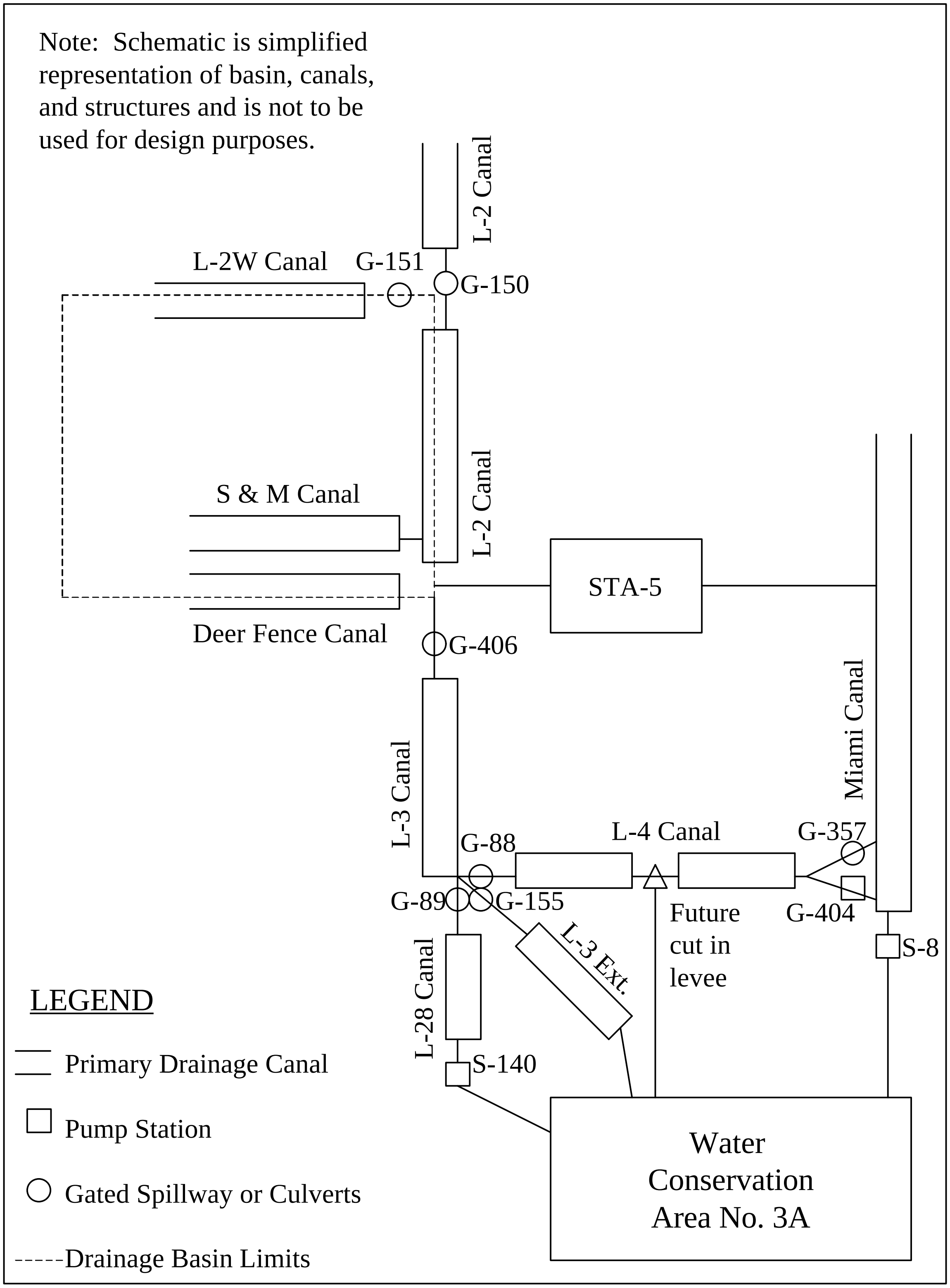

**Appendix 1-3. S-6 Basin Schematic**



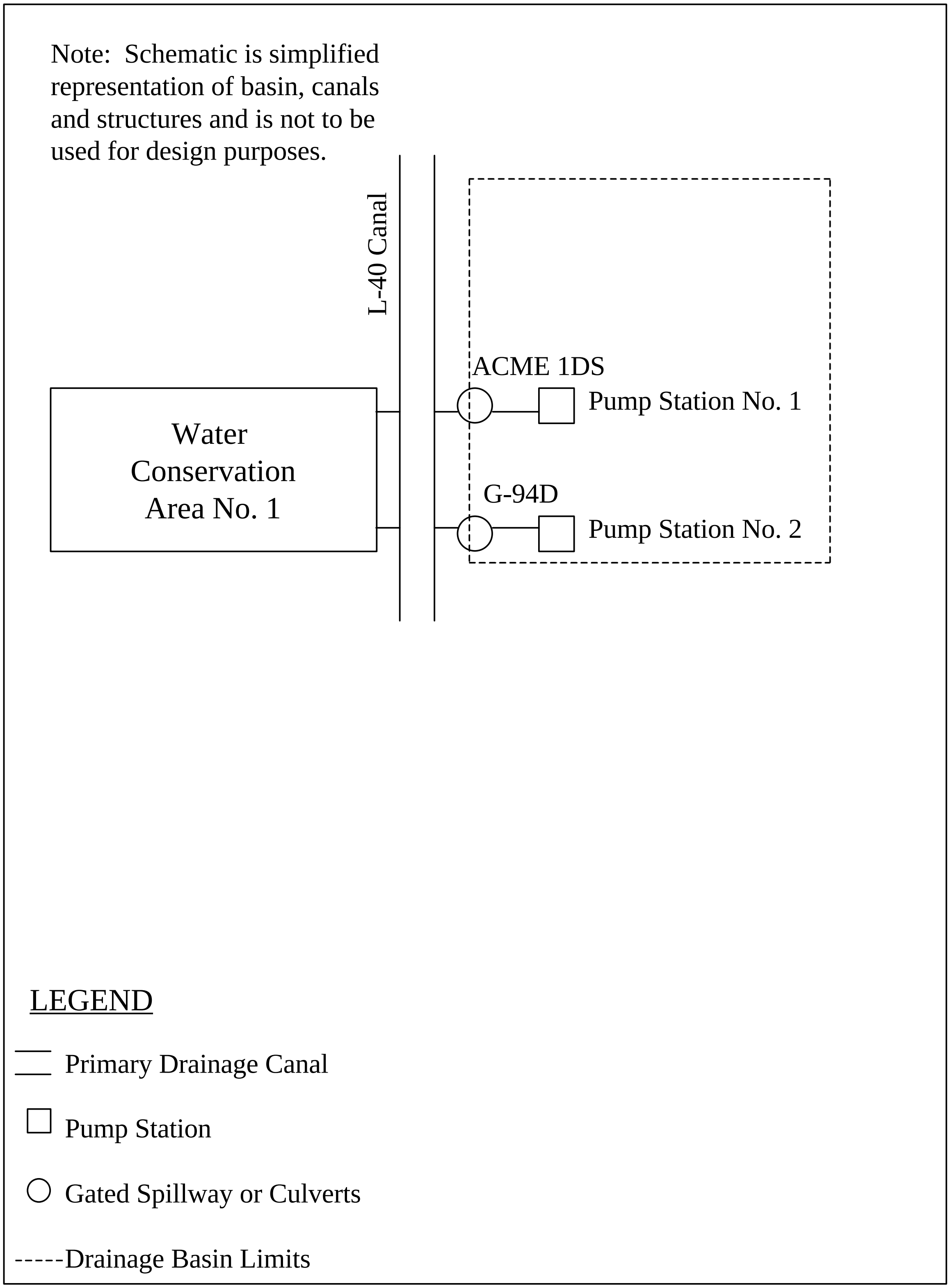

**Appendix 1-4. S-7 Basin Schematic**




**Appendix 1-5. S-8 Basin Schematic**

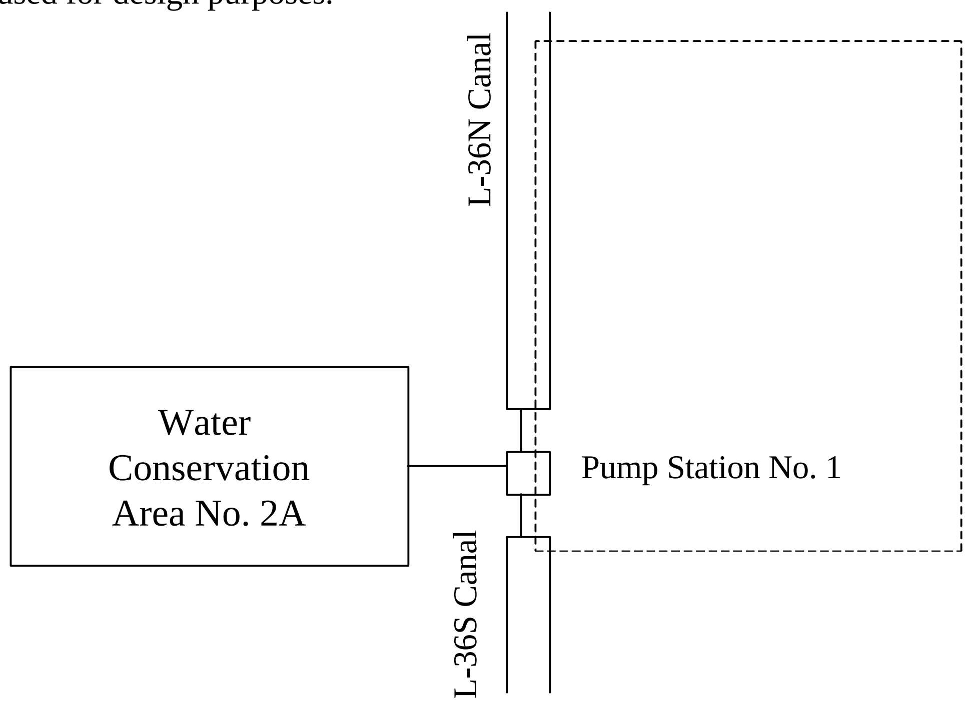



**Appendix 1-6. C-139 Basin Schematic**




**Appendix 1-7. Acme Basin B Schematic**

Note: Schematic is simplified representation of basin, canals, and structures and is not to be used for design purposes.




LEGEND

Primary Drainage Canal

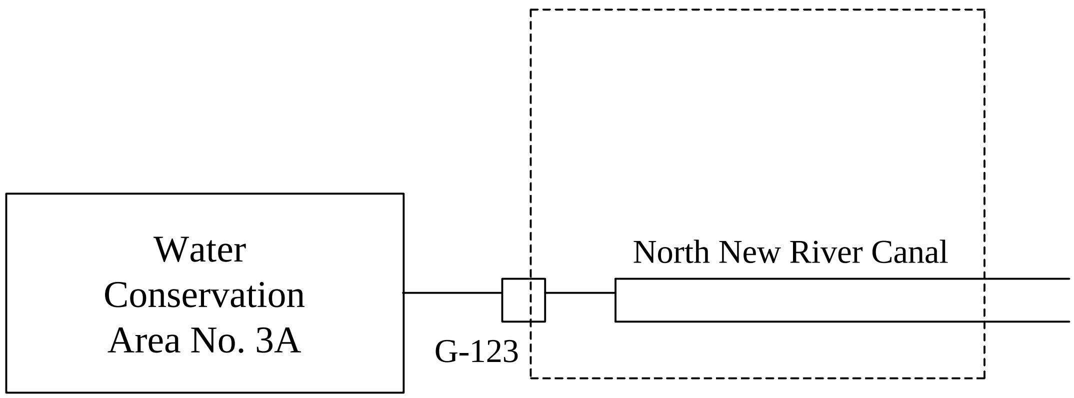
Pump Station

Gated Spillway or Culverts

-----Drainage Basin Limits

**Appendix 1-8. NSID Basin Schematic**

Note: Schematic is simplified representation of basin, canals, and structures and is not to be used for design purposes.




LEGEND

Primary Drainage Canal

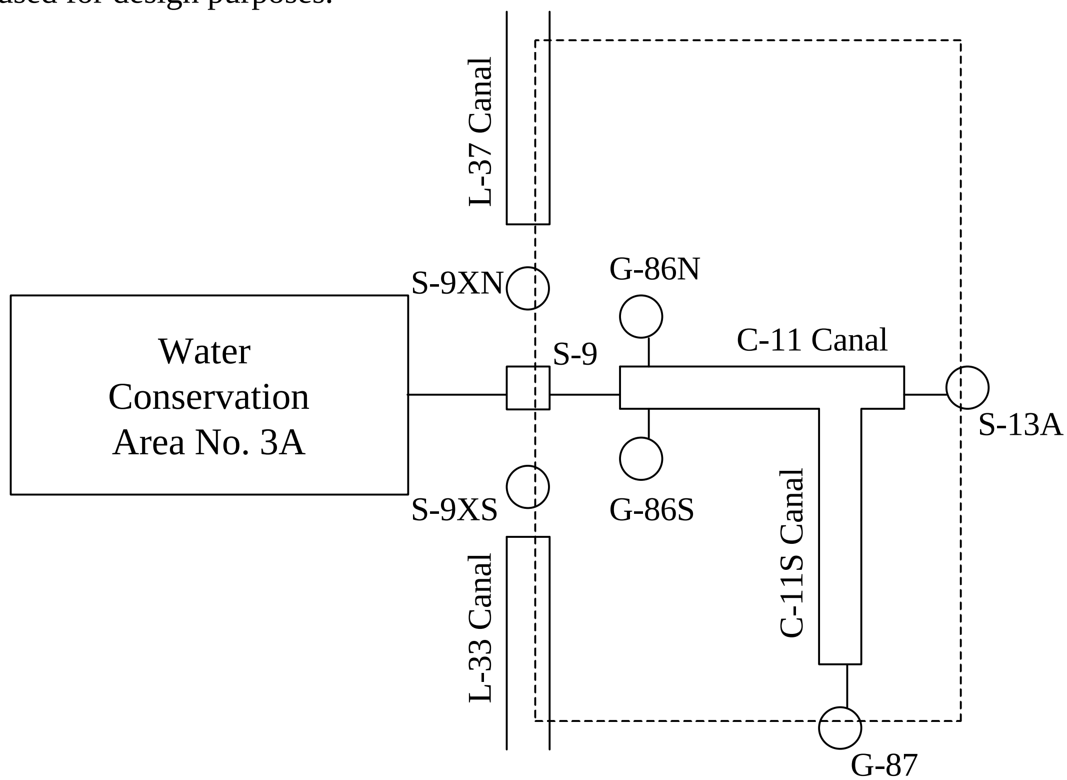
Pump Station

Gated Spillway or Culverts

-----Drainage Basin Limits

**Appendix 1-9. North New River Canal Basin Schematic**

Note: Schematic is simplified representation of basin, canals, and structures and is not to be used for design purposes.




LEGEND

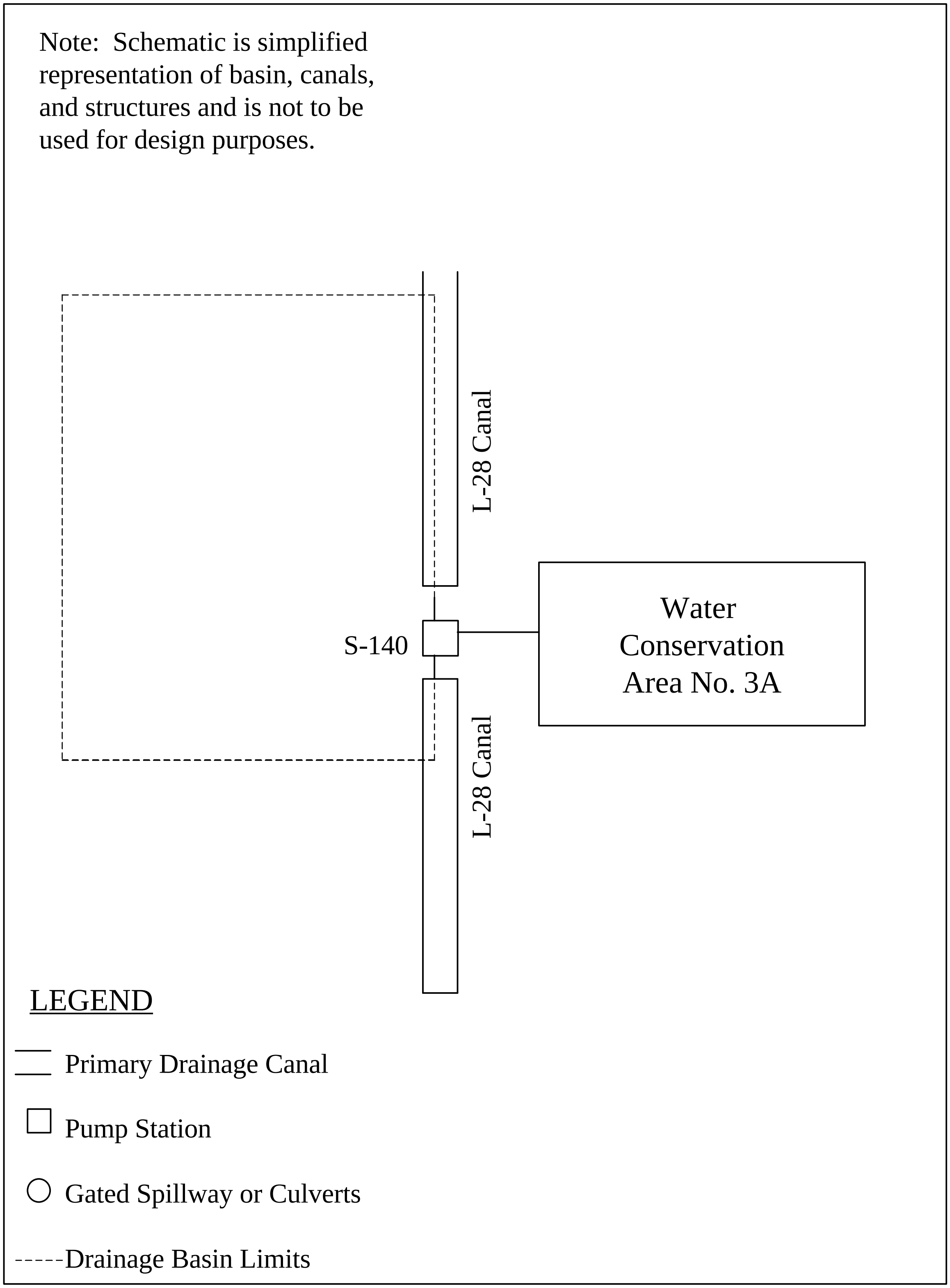
Primary Drainage Canal

Pump Station

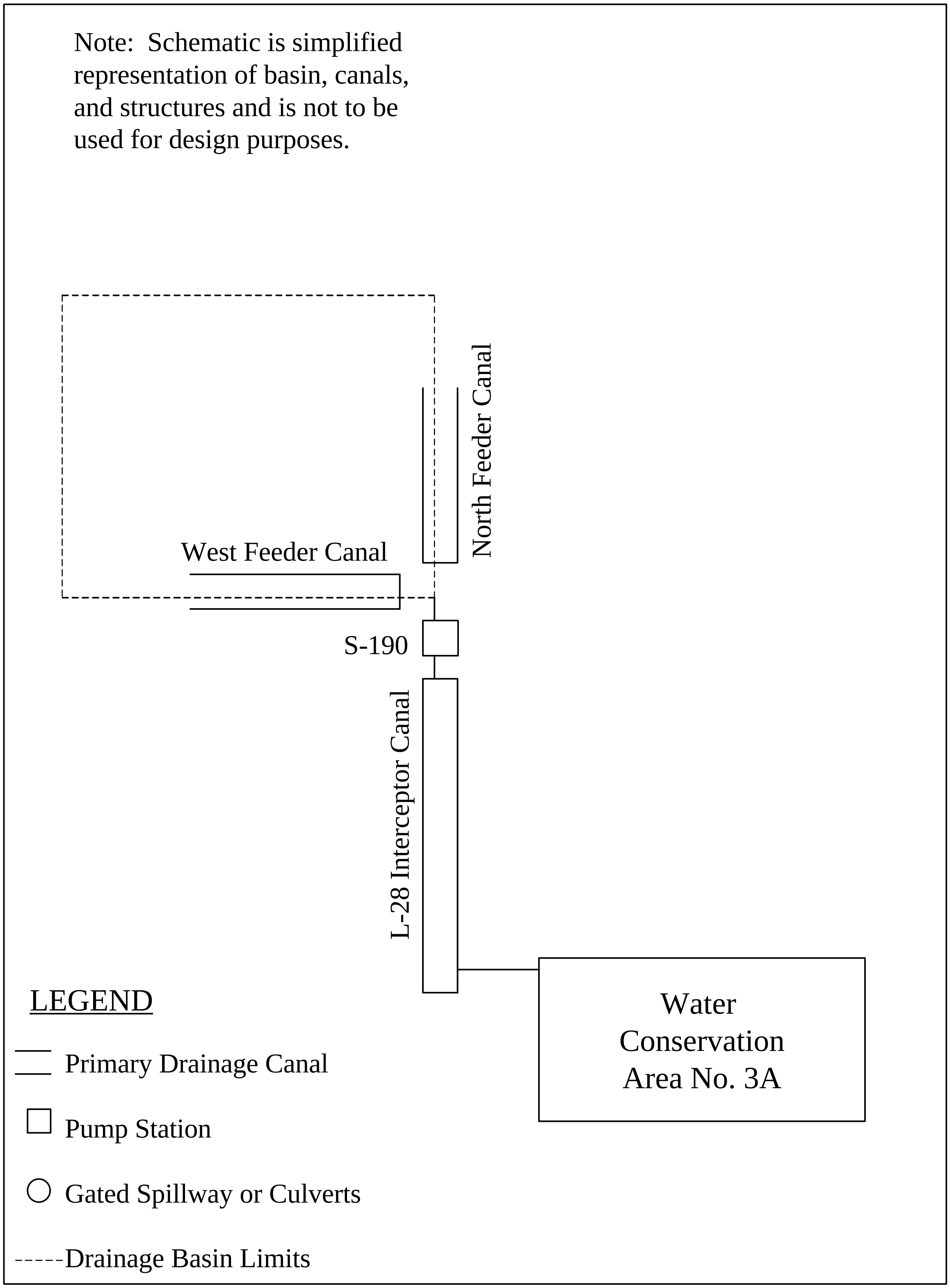
Gated Spillway or Culverts

-----Drainage Basin Limits

**Appendix 1-10. C-11 West Basin Schematic**




**Appendix 1-11. L-28 Basin Schematic**




**Appendix 1-12. Feeder Canal Basin Schematic**

## APPENDIX 3-1. Excluded Outlier Data

DO measured for automatic sampler sample:

| | | | | | | |
|---|---|---|---|---|---|---|
| USL3BRS | 8 | CAMB | 19950517 | 24 | 6.440 | DO |
| USL3BRS | 8 | CAMB | 19980521 | 0 | 3.490 | DO |
| USL3BRS | 8 | CAMB | 19980709 | 0 | 2.530 | DO |
| USL3BRS | 8 | CAMB | 19981217 | 0 | 5.520 | DO |
| G136 | 8 | CAMB | 19950517 | 24 | 6.660 | DO |

FIELD COND. measured for automatic sampler sample:

| | | | | | | |
|---|---|---|---|---|---|---|
| USL3BRS | 9 | CAMB | 19950517 | 24 | 460.000 | FIELD COND. |
| USL3BRS | 9 | CAMB | 19980521 | 0 | 563.000 | FIELD COND. |
| USL3BRS | 9 | CAMB | 19980709 | 0 | 536.000 | FIELD COND. |
| USL3BRS | 9 | CAMB | 19981217 | 0 | 553.000 | FIELD COND. |
| G136 | 9 | CAMB | 19950517 | 24 | 578.000 | FIELD COND. |

Data for automatic sampler but no automatic sampler for the site:

| | | | | | | |
|---|---|---|---|---|---|---|
| L3BRS | 25 | CAMB | 19970904 | 24 | 0.141 | TP |

Mis-coding. Values too high:

| | | | | | | |
|---|---|---|---|---|---|---|
| G136 | 8 | CAMB | 19971204 | 0 | 542.000 | DO |
| G200 | 8 | HOLY | 19961119 | 0 | 521.000 | DO |
| S18C | 8 | ENP | 19990414 | 0 | 769.000 | DO |
| S5A | 8 | CAMB | 19980421 | 0 | 706.000 | DO |

Mis-coding. Values too low:

| | | | | | | |
|---|---|---|---|---|---|---|
| ACME1DS | 9 | CAMB | 19970225 | 19 | 6.740 | FIELD COND. |
| L40-2 | 9 | CAMB | 19960930 | 19 | 0.510 | FIELD COND. |
| S5A | 9 | CAMB | 19981201 | 0 | 23.700 | FIELD COND. |
| S9 | 9 | CAMB | 19981027 | 0 | 2.530 | FIELD COND. |

Mis-coding. Values too low. Probably quality control blank:

| | | | | | | |
|---|---|---|---|---|---|---|
| S5A | 25 | CAMB | 19950404 | 24 | -0.004 | TP |

Quality control samples:

| | | | | | | |
|---|---|---|---|---|---|---|
| ENR012 | 9 | LAB | 19950627 | 24 | 861.000 | FIELD COND. |
| ENR012 | 14 | LAB | 19950627 | 24 | 898.000 | LAB COND. |
| ENR012 | 25 | LAB | 19940818 | 24 | 0.025 | TP |
| ENR012 | 25 | LAB | 19950627 | 24 | 0.029 | TP |
| ENR012 | 8 | LAB | 19940818 | 24 | 1.980 | DO |
| ENR012 | 8 | LAB | 19950627 | 24 | 5.500 | DO |

EAA Rule 40E-63 TP load calculation program outlier screening:

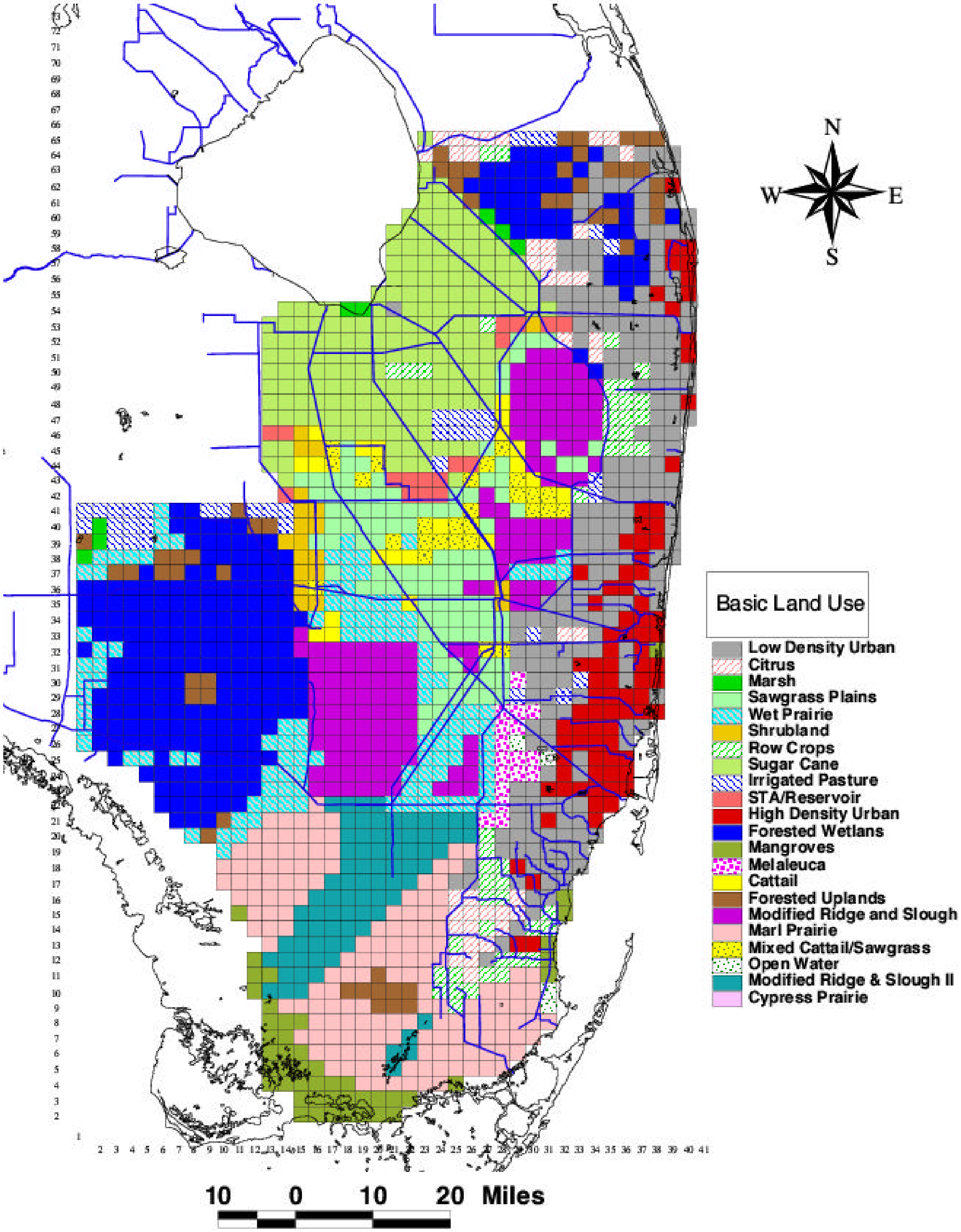
| | | | | | | |
|---|---|---|---|---|---|---|
| S5A | 25 | CAMB | 19900625 | 19 | 0.409 | TP |

Outlier data flagged by District Environmental Monitoring and Assessment staff:

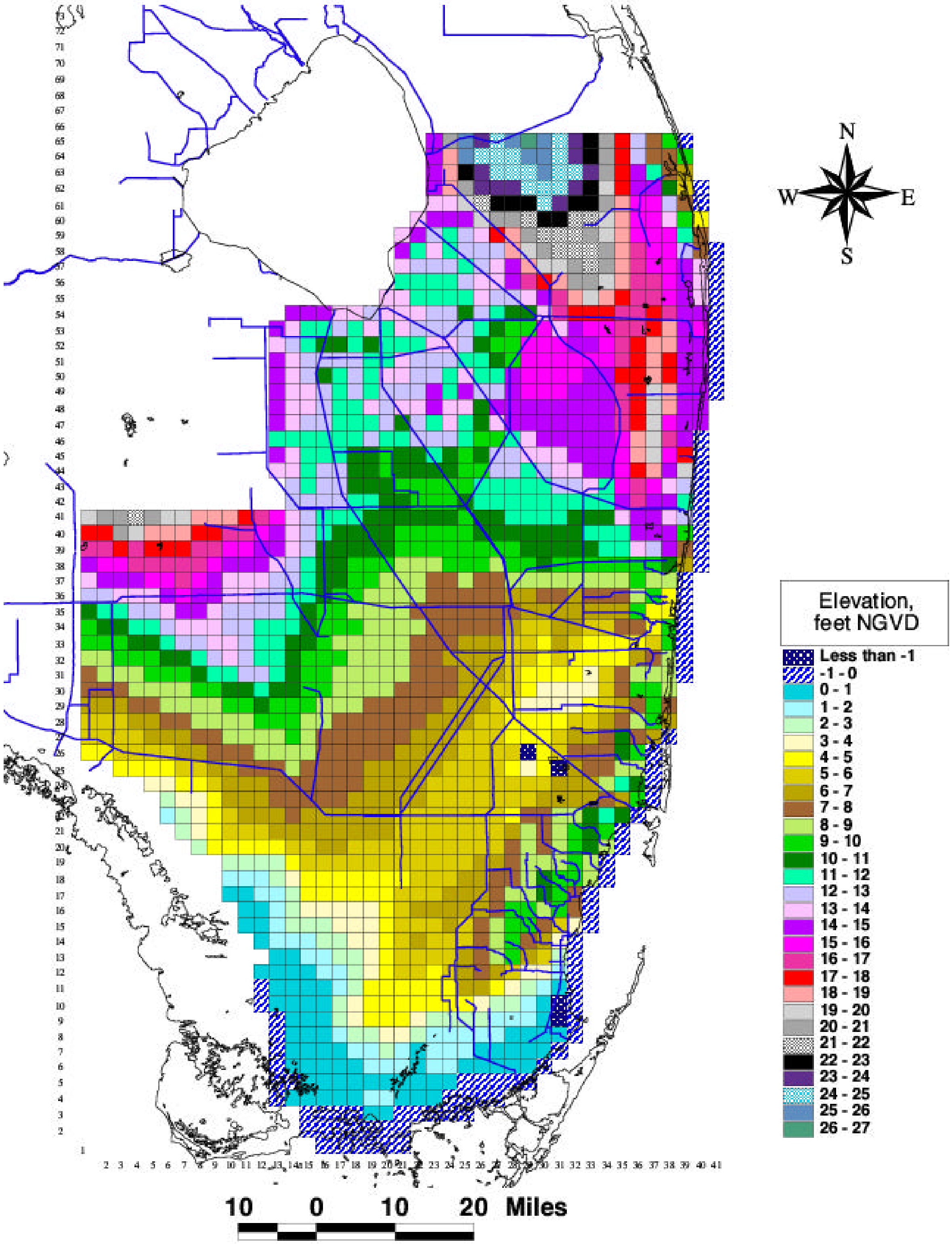
| | | | | | | |
|---|---|---|---|---|---|---|
| S150 | | CAMB | 19970805 | 24 | 0.679 | TP |
| S6OUT | | CAMB | 19970315 | 24 | 0.722 | TP |
| S6OUT | | CAMB | 19970422 | 24 | 0.341 | TP |

## Appendix 3-2. SFWMM input parameters

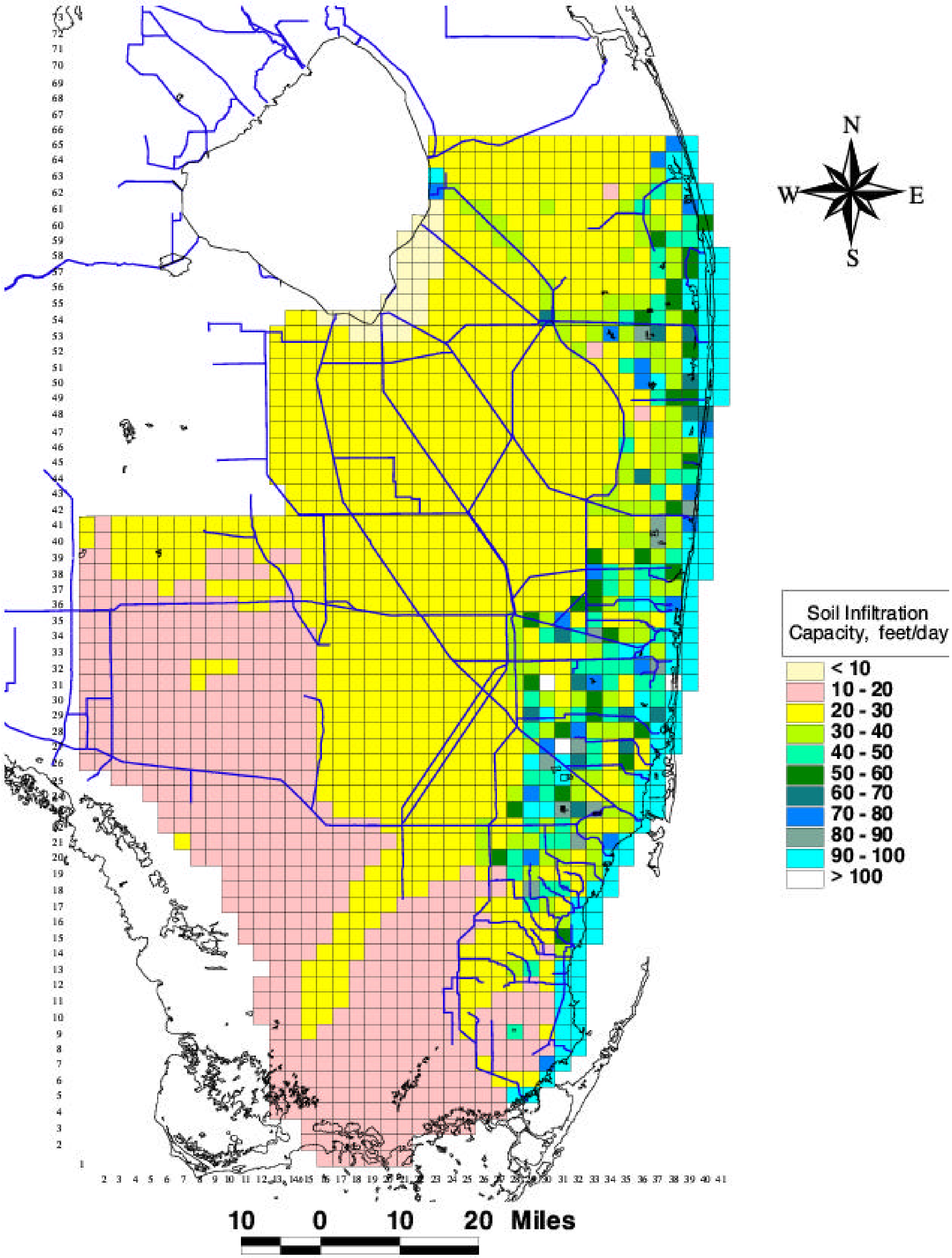
# BASIC LAND USE
# ECP BASERR1 using SFWMM v3.8



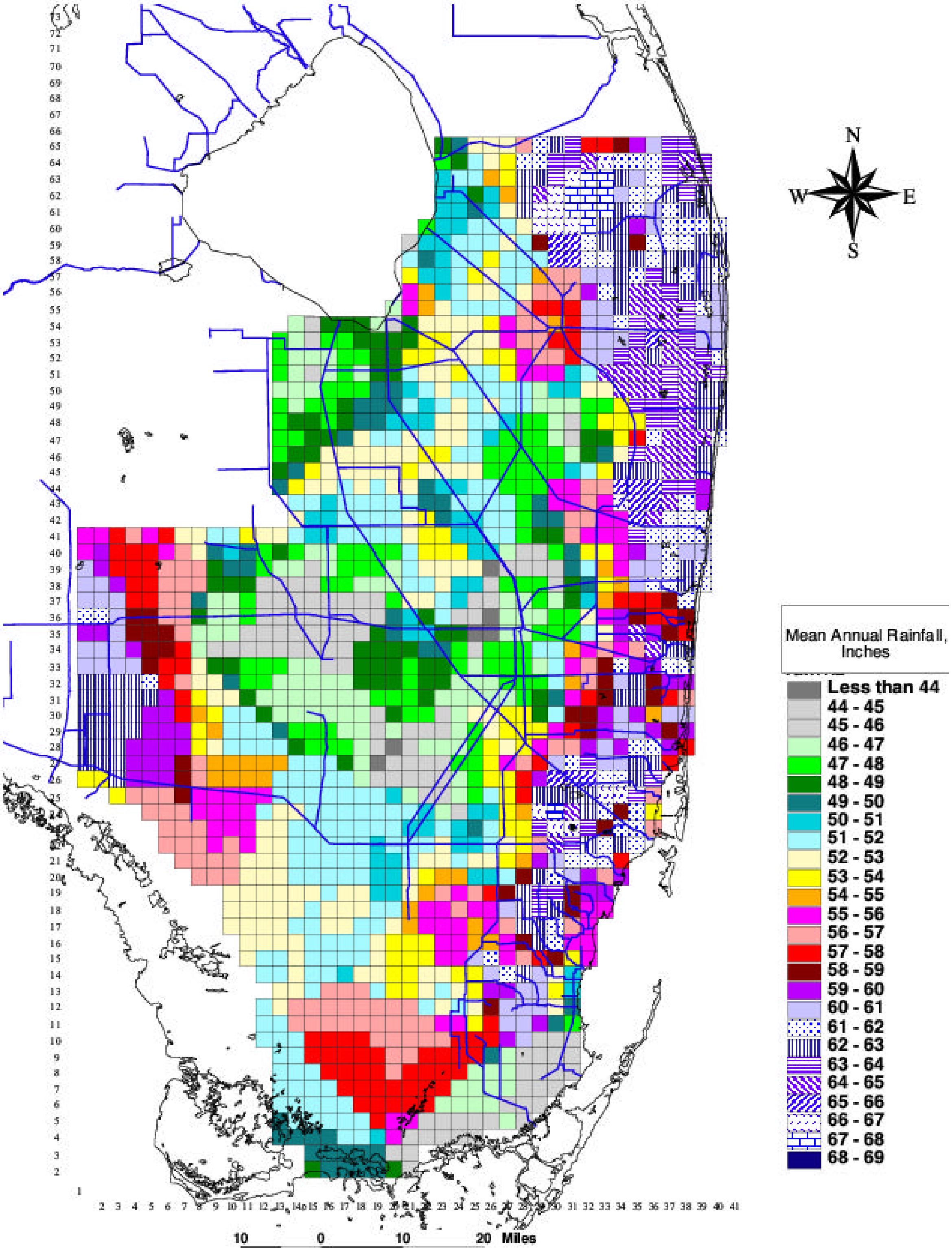
# GRID ELEVATION
# ECP BASERR1 using SFWMM v3.8



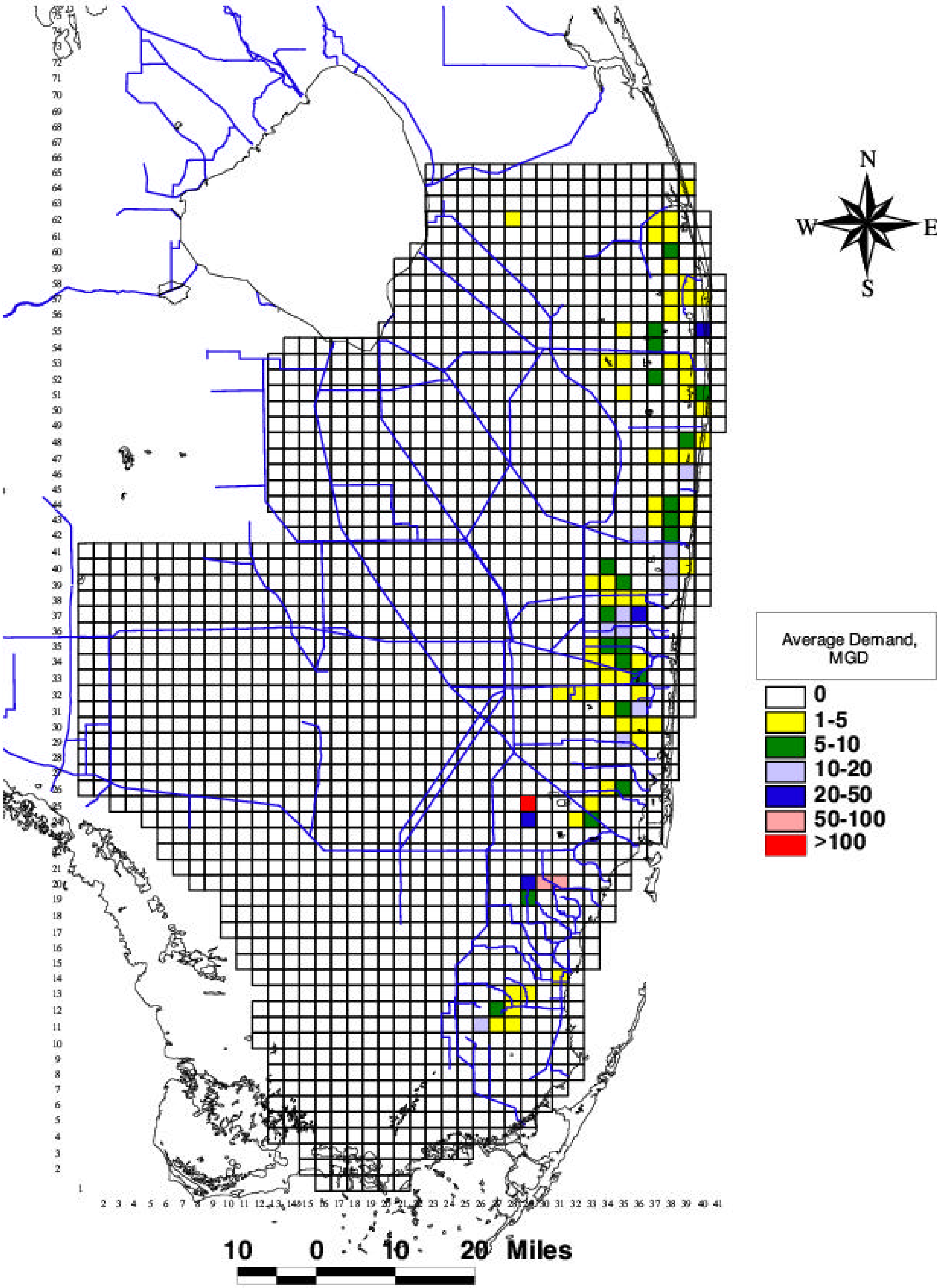
# SOIL INFILTRATION CAPACITY
# ECP BASERR1 using SFWMM v3.8



# MEAN ANNUAL RAINFALL
# ECP BASERR1 using SFWMM v3.8



# AVERAGE DAILY WELLFIELD DEMANDS
# ECP BASERR1 using SFWMM v3.8



# Structure Capacities Used for the ECP BASERR1

(6/5/2001)

| SFWMM Structure Name | Capacity; Discharge Equation Used (units: cfs) | Description / Comments |
|---|---|---|
| STA 3/4 Inflow#1 | 3670. | Represents G-372 |
| STA 3/4 Inflow #2 | 2170. | Represents G-370 |
| ST3S81 | 718 x $(stg@r42c22 - 11.2)^{1.5}$ | Portion of outflow from STA-3&4 that potentially could be routed through S8 |
| ST3S71 | 818 x $(stg@r42c24 - 11.7)^{1.5}$ | Portion of outflow from STA-3&4 that potentially could be routed through S7 |
| LC101 Inflow#1 | 4800. | |
| ST1WI1 | 3250.; 911 x $(stg@r53c30 – 16.0)^{1.5}$ | inflow into STA-1W |
| ST1EI1 | 1750.; 304 x $(stg@r53c30 – 16.5)^{1.5}$ | inflow into STA-1E via L-101 (up to 1,750 cfs runoff from EAA_WPB basin) |
| STA2 Inflow#1 | 3375. | Combined capacity for S-6 (2,925 cfs) & G-328 (450 cfs) |
| STA2 Inflow#2 | 450. | |
| ST2OT1 | 3040.; 667 x $(stg@r44c26 – 11.25)^{1.5}$ | flow from STA-2 into WCA-2A |
| ST1WQ1 | 3490.; 759 x $(stg@r52c28 – 11.25)^{1.5}$ | flow from STA-1W into WCA-1 |
| STA1E Inflow#2 | 3980. | Flow from C51W basin through S319 |
| STA1E Inflow#3 | 50. | Drainage from Sections 13 & 14 (Range 40E, Township 44S) |
| ST1EQ1 | 4200.; 810 x $(stg@r53c31 – 15.45)^{1.5}$ | flow from STA-1E into WCA-1 |
| S319WS | 940 x $(stg@r53c31 - 14.25)^{0.5}$ | water supply to C-51 from STA-1E via S-319 |
| STA5 Inflow#1 | 2510. | |
| ST5OT1 | 200 x $(stg@r46c14 – 13)^{1.5}$ | discharge from STA5 into Rotenberger Tract; 240 cfs goes to marsh and the rest goes through the northern canal. |
| STA6 Inflow#1 (U1TL28) | 500. | Inflow from USSC Unit 2 |
| STA6 Inflow#2 (SUGRF) | 250. | Inflow from C-139 Annex |
| STA6 Inflow#3 | Unlimited; controlled by available inflow volume and available storage in STA6 | Drainage from C-139 Basin |
| ST6OT1 | 275 x $(stg@r42c14 - 14.25)^{1.5}$ | total discharge from STA6 |
| ROTOT1 | 463 x $(stg@ROTEN - 12)^{0.5}$ | outflow from northern canal ROTEN in Rotenberger Tract |
| ROTOT2 | 144 x $(stg@r45c16 - 12)^{0.5}$ | outflow from Rotenberger Tract |
| ROTOT3 | 96 x $(stg@r44c16 - 12)^{0.5}$ | additional outflow for flood control from Rotenberger Tract |
| L8RESERVOIR Inflow#1 | 1100. | |
| RESTL8 | 55 x $(stg@r59c29 - 21)^{1.5}$ | flood control releases from reservoir in Indian Trails Water Control District into L-8 canal |
| RESL8O | 55 x $(stg@r59c29 - 27.5)^{1.5}$ | emergency overflow from Indian Trails reservoir to L-8 canal |
| S343A&B(total) | 390. | flow from CA-3 canal to TAMIA canal |

| | | |
|---|---|---|
| L28WQ | 6.22x35x(stg@r33c16 - 10)$^{1.5}$ | Assumed weir length is 35 ft. |
| S9 | 2880. | pumped flow from C-11W canal to WCA-3A which includes seepage into L-37 and L-33 borrow canals |
| S319 | 3600. | flow from western C-51 basin into STA-1E via S-319 |
| ACMEWS | 135. | ACME District water supply met by WCA-1 |
| NSIMP2 | 100. | Represents 50,00 GPM pump in NSID Pump Sta.1 |
| NSIMP3 | 330. | Represents 3x50,000 GPM pumps in NSID Pump Sta.1 |
| G200 | 750. | |
| S5A1 | 4800. | discharge from EAA_WPB basin to WCA-1 or STA-1W and STA-1E through S-5A pumps |
| S8 | 4170. | discharge from EAA_MIAMI basin to L-23E canal in northwestern WCA-3A |
| S7 | 2490. | discharge from EAA_NNR/HLSB basin to L-38 canal in WCA-2A |
| S6 | 2925. | discharge from EAA_NNR/HLSB basin to WCA-1 (current operation) or to STA-2 (proposed operations) |
| S150 | 1000. | discharge from EAA_NNR/HLSB basin to conveyance canal in WCA-3A (CA3 canal) |
| S140A | 1300. | total flow from L-28 canal to C-60 canal in WCA-3A |

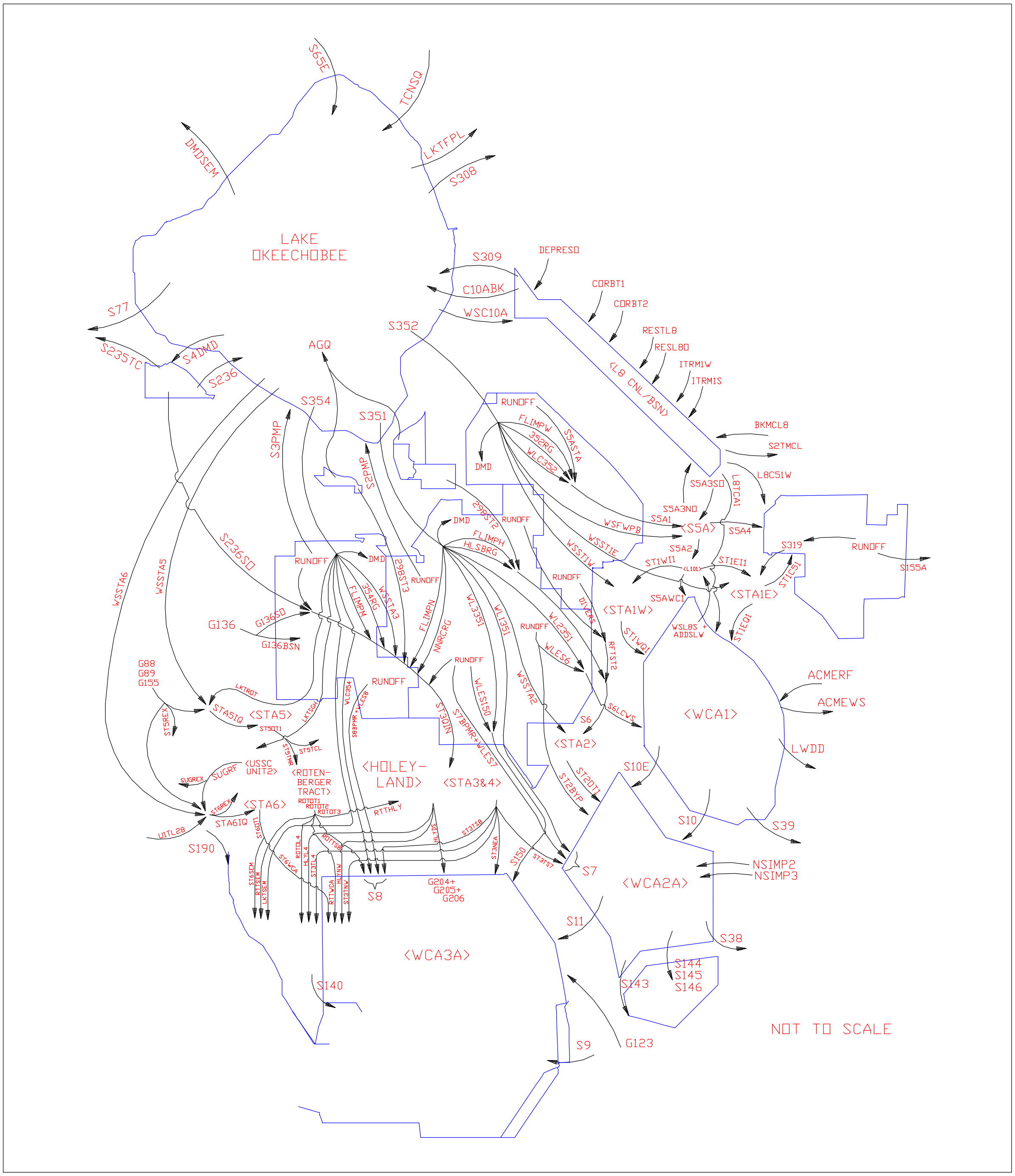
Notes:

Output directory: ../ECP/O_ECP_BASERR1_V3.8.1
Input directory: ../ECP/INPUT/V3.8.1
Input files: reservoir_input.dat
cndta22_rr1
lecdef
gen_nodal_dep_struc.dat

## WSE Operational Guidelines Decision Tree – 1/2

## WSE Operational Guidelines Decision Tree – 2/2

## Lake Okeechobee Release Schedule



**ECP BASERR1 Flow Distribution Diagram from South Florida Water Management Model.**

## APPENDIX 3-3. Combining Flow with Phosphorus Data

The observed water quality data and simulated flows were combined for each basin to create a complete 31-year period of daily data. Numerous methods of combining simulated flow with observed phosphorus data were evaluated. The key factors in evaluating the various methods are presented below in order of priority.

1. Does the method preserve the long-term (31-year) hydrologic variability (minimum, average and maximum) associated with the 31-year rainfall/runoff characteristics for each basin?
2. Does the method preserve the observed variability in phosphorus concentrations?
3. Does the method preserve the observed long-term flow-weighted mean phosphorus concentrations?
4. Is the method consistent across all the basins?

Subsequent evaluation of alternative water quality solutions will be based on anticipated flows representing future conditions; hence preservation of the long-term flow weighted mean phosphorus concentration was determined to be more critical than preserving the total phosphorus loads observed during the period of record. Adjustments to the flows and phosphorus loads will be estimated in a subsequent work effort prior to evaluation of alternative water quality solutions.

A summary of the alternative methods of combining flow and phosphorus data is presented below.

1. **Use the observed flow and phosphorus data, i.e., do not use the simulated flows.**
   A. Preserve the long-term hydrologic variability? – No, due to the limited period of record of phosphorus data in all basins, and limited flow data in some basins.
   B. Preserve observed variability in concentrations (minimum, average, and maximum)? – Yes, subject to the length of the period of record for the phosphorus data.
   C. Preserve the observed long-term flow-weighted mean phosphorus concentrations? – Yes, subject to the length of the period of record for the phosphorus data.
   D. Consistent across all the basins? – No, due to the variability in the length of the available historic records varies among the basins.

2. **Apply the long-term flow-weighted mean concentration to the simulated 31-year flows to generate a time series of phosphorus values.**
   A. Preserve the long-term hydrologic variability? – Yes.
   B. Preserve observed variability in concentrations (minimum, average, and maximum)? – No temporal variability of phosphorus concentrations is preserved.
   C. Preserve the observed long-term flow-weighted mean phosphorus concentrations? – Yes, to the degree that the simulated flows accurately reproduce the actual flows.
   D. Consistent across all the basins? – Yes.

3. **Modification to Method 2. For the period WY1990-1999, apply the annual/monthly flow-weighted mean concentration to the flows within that year's/month's simulation.**

A. Preserve the long-term hydrologic variability? – Yes.
B. Preserve observed variability in concentrations (minimum, average, and maximum)? – No, limited to annual/monthly variability during data period of record.
C. Preserve the observed long-term flow-weighted mean phosphorus concentrations? – Limited to the degree that the simulated flows accurately reproduce the actual flows. Method 2 would be used for the remainder of the 31-year period of simulation.
D. Consistent across all the basins? – Yes, subject to the period of record limitation identified above.

4. **Develop a regression model correlating observed phosphorus concentrations to observed flow, and apply this regression model to the 31-year period of simulated flows.**
   A. Preserve the long-term hydrologic variability? – Yes.
   B. Preserve observed variability in concentrations (minimum, average, and maximum)? – This will capture variability, although it may not reproduce the extreme (minimum and maximum) values. In addition, we could develop a wet/dry seasonal regression equation to capture seasonality.
   C. Preserve the observed long-term flow-weighted mean phosphorus concentrations? – Use of the ordinary least squares method will preserve the long-term arithmetic mean, yet may not reproduce the flow-weighted mean. This method would also be limited to the period of record for phosphorus and only to the degree that the simulated flows accurately reproduce the actual flows.
   D. Consistent across all the basins? – Yes, subject to the period of record limitation identified above.

5. **Same as Method 4, except using regression of annual flow-weighted means with annual flow volumes for the WY1990-1999 period of record.**
   A. Preserve the long-term hydrologic variability? – Yes.
   B. Preserve observed variability in concentrations (minimum, average, and maximum)? – Limited to cumulative annual values, and not daily time series. This will capture variability, although it may not reproduce the extreme (minimum and maximum) values.
   C. Preserve the observed long-term flow-weighted mean phosphorus concentrations? – Limited to the accuracy of the regression equation to predict phosphorus concentrations as a function of annual flow. This method would also be limited to the period of record for phosphorus and only to the degree that the simulated flows accurately reproduce the actual flows. Another method would need to be used for the remainder of the 31-year period. In addition, co-relating flow against flow-weighted mean concentrations violates the need for independence of the variables, and the resulting regression could be spurious correlation.
   D. Consistent across all the basins? – Yes, subject to the period of record limitation identified above.

6. **Same as Method 4, except use interpolated daily phosphorus values regressed against daily interpolated flows, after trying to recreate the basin simulated flows to match historic values.** While the evaluation is similar to Method 4, it would be very time

consuming and difficult to simulate period of record historic flows for each of the basins due to the uncertainty of the operational conditions that may have existed during the time period. The only benefit would potentially be an improved comparison of phosphorus for the period of record; another method would have to be used for the balance of the 31-year period of simulation.

7. **Combine Method 2 for WY1965-1989, and Method 6 for WY1990 through WY1995.** The uncertainty of whether or not this will improve the phosphorus data limits the applicability of this combined methodology. Subject to the same inability to preserve the variability of phosphorus for 1965-1989 as Method 2.

8. **Modification of Method 4.** In lieu of regression equations, estimate phosphorus concentrations within 2-4 specific ranges of flows, for example, between 0 and 500 cfs, 500-1000 cfs, 1000-2000 cfs, and greater than 2000 cfs. This approach could use the arithmetic average of all phosphorus concentrations within a specific flow range. The benefit would potentially be to better predict the relationship between flow and phosphorus, although the ordinary least squares regression by definition will produce the best prediction. Hence, there would be no benefit over Method 4.

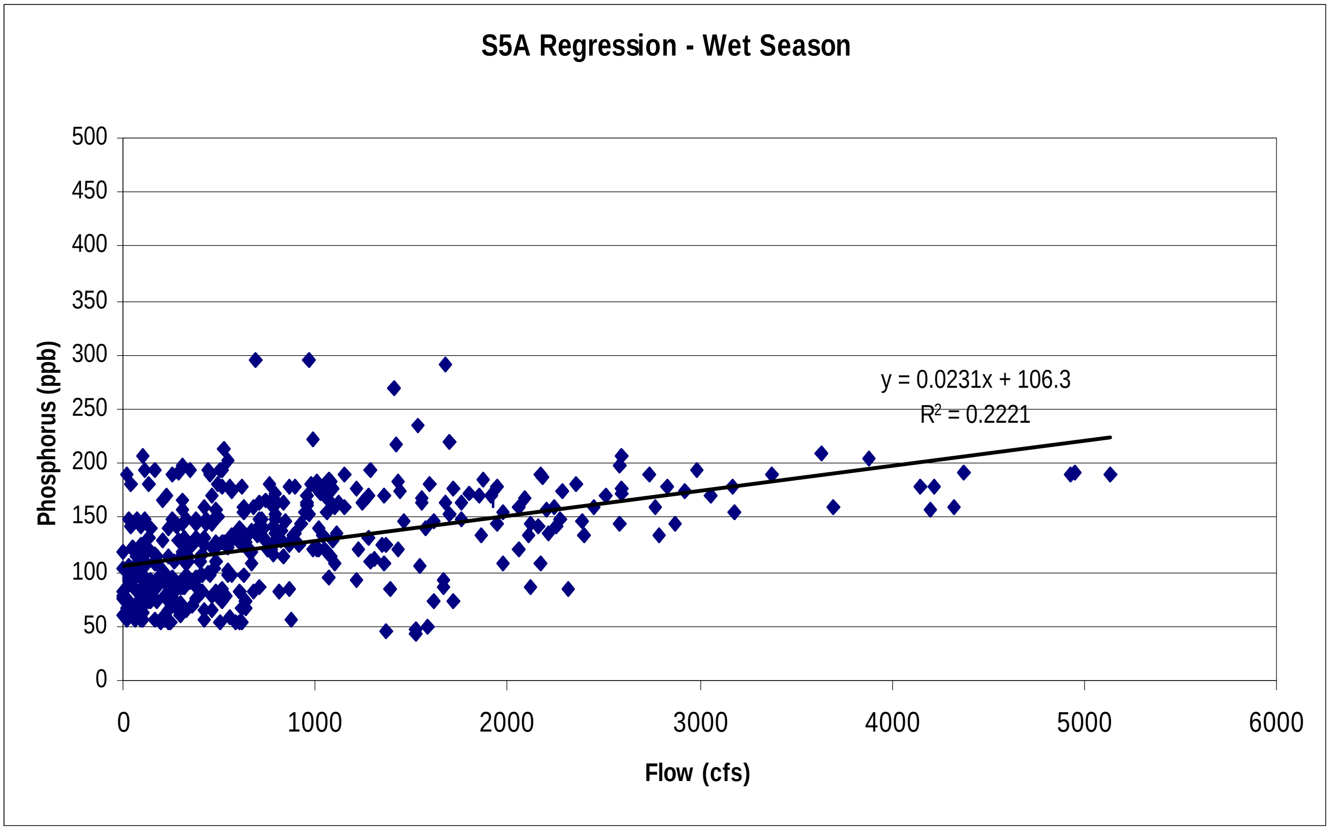
9. **Modification of Method 2.** For stations with no flow data, could use the arithmetic average phosphorus concentration. This method was used for North New River Canal Basin structure G-123.

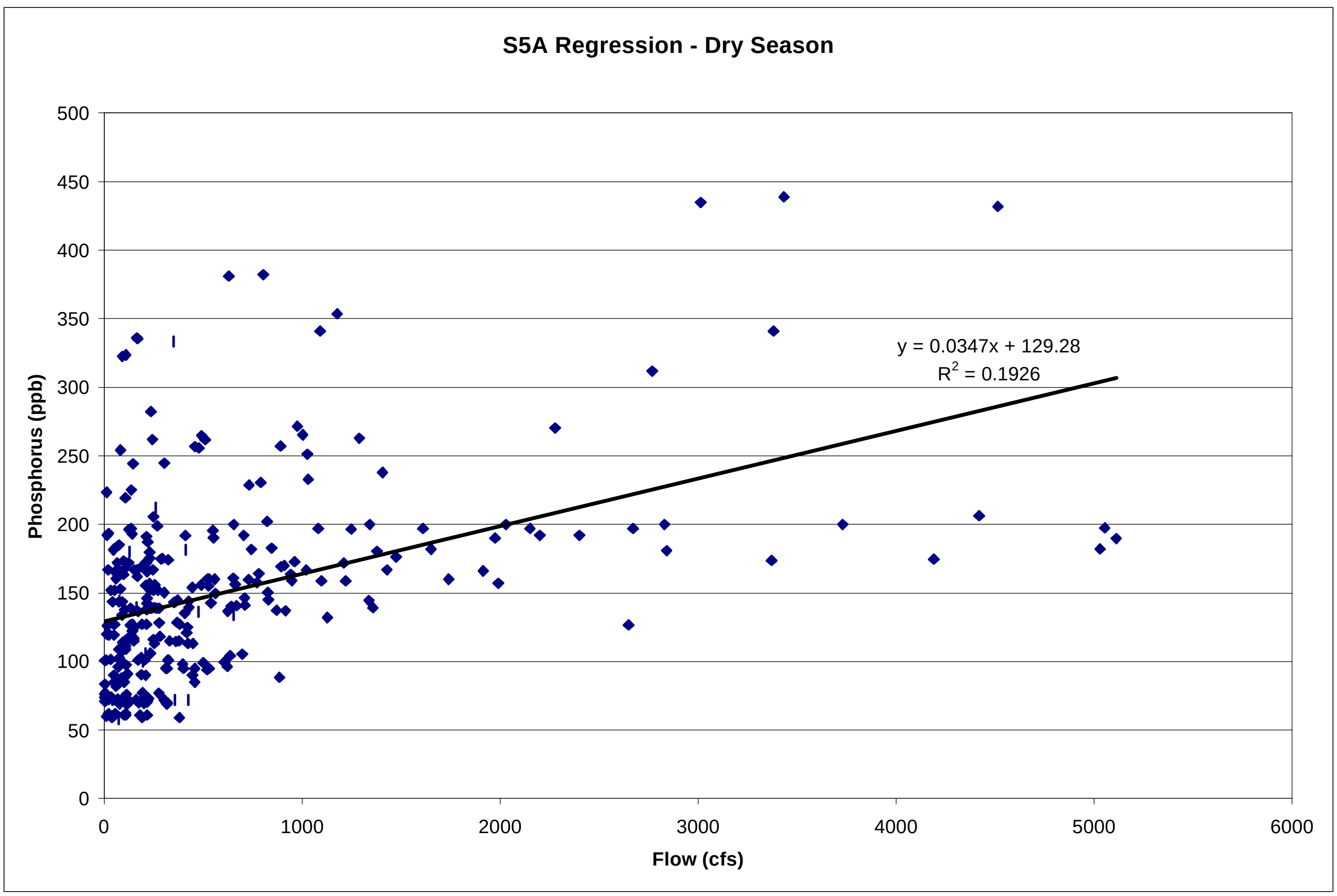
10. **For each year, identify the year with the closest amount of rain during the baseline period (WY90-99), and use that year's flow-weighted mean phosphorus concentration to develop the baseline phosphorus data set.** Determine the annual rainfall amounts for each basin for the years 1965-1995. The perceived benefit would be to better (relative to Method 2) reproduce the variability in phosphorus concentrations as a function of annual rainfall volumes. Another method would need to be used for the remainder of the 31-year period. However, Method 4 captures this in a more rigorous approach.

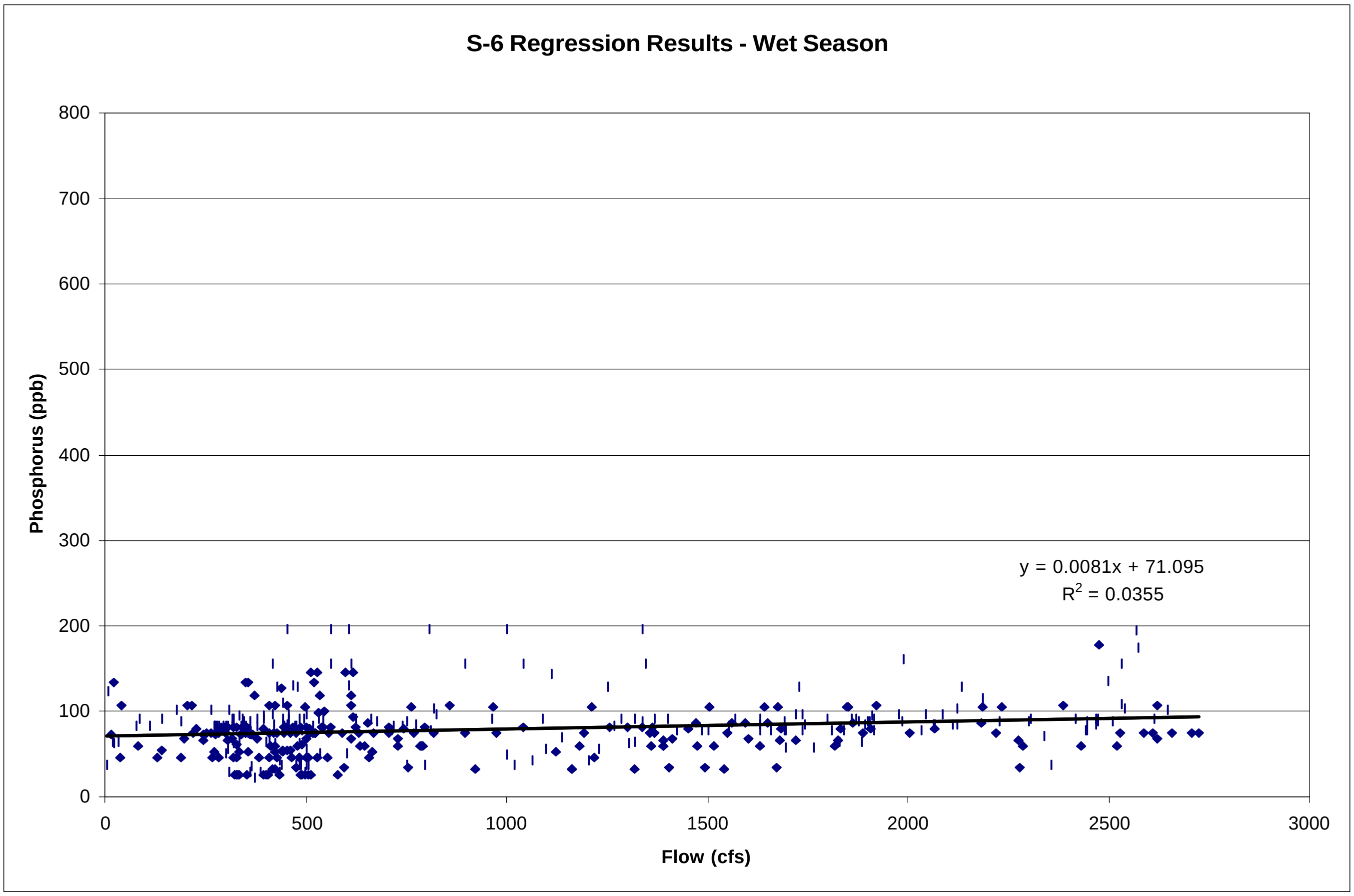
11. **Similar to Method 9, but use annual observed flows instead of annual observed rainfall for each basin.** The perceived benefit would be to better (relative to Method 2) reproduce the variability in phosphorus concentrations as a function of annual flows. Due to the limited flow data set in some of the basins, this method may have limited applicability. Another method would need to be used for the remainder of the 31-year period. Again, Method 4 captures this in a more rigorous approach.

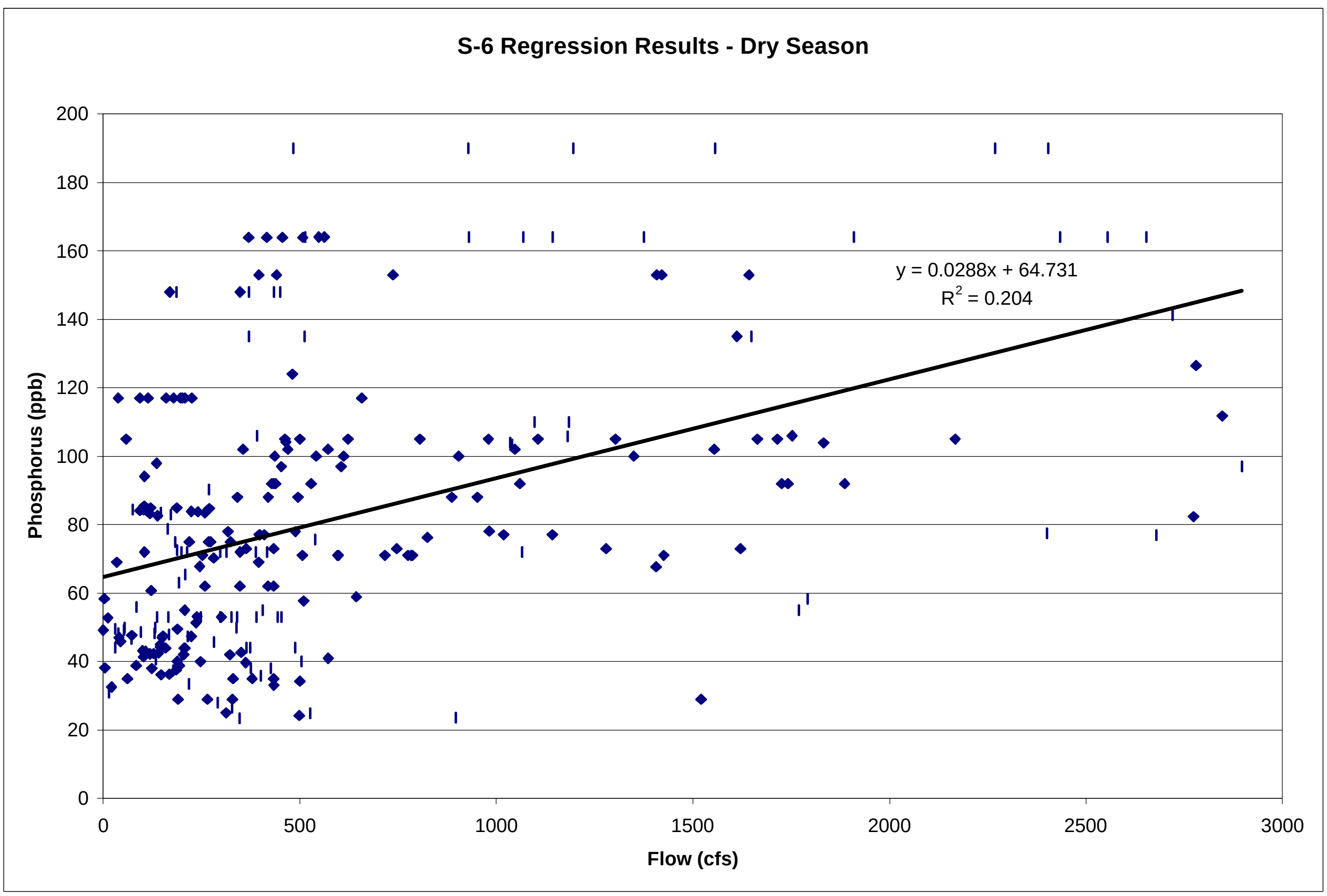
12. **Modification of Method 2: could add random error term to simulate the variability in phosphorus concentrations.** In addition to the benefits of Method 2, the added benefit of synthesizing the variability in phosphorus concentrations is appealing. However, Method 4 captures this in a more rigorous approach.

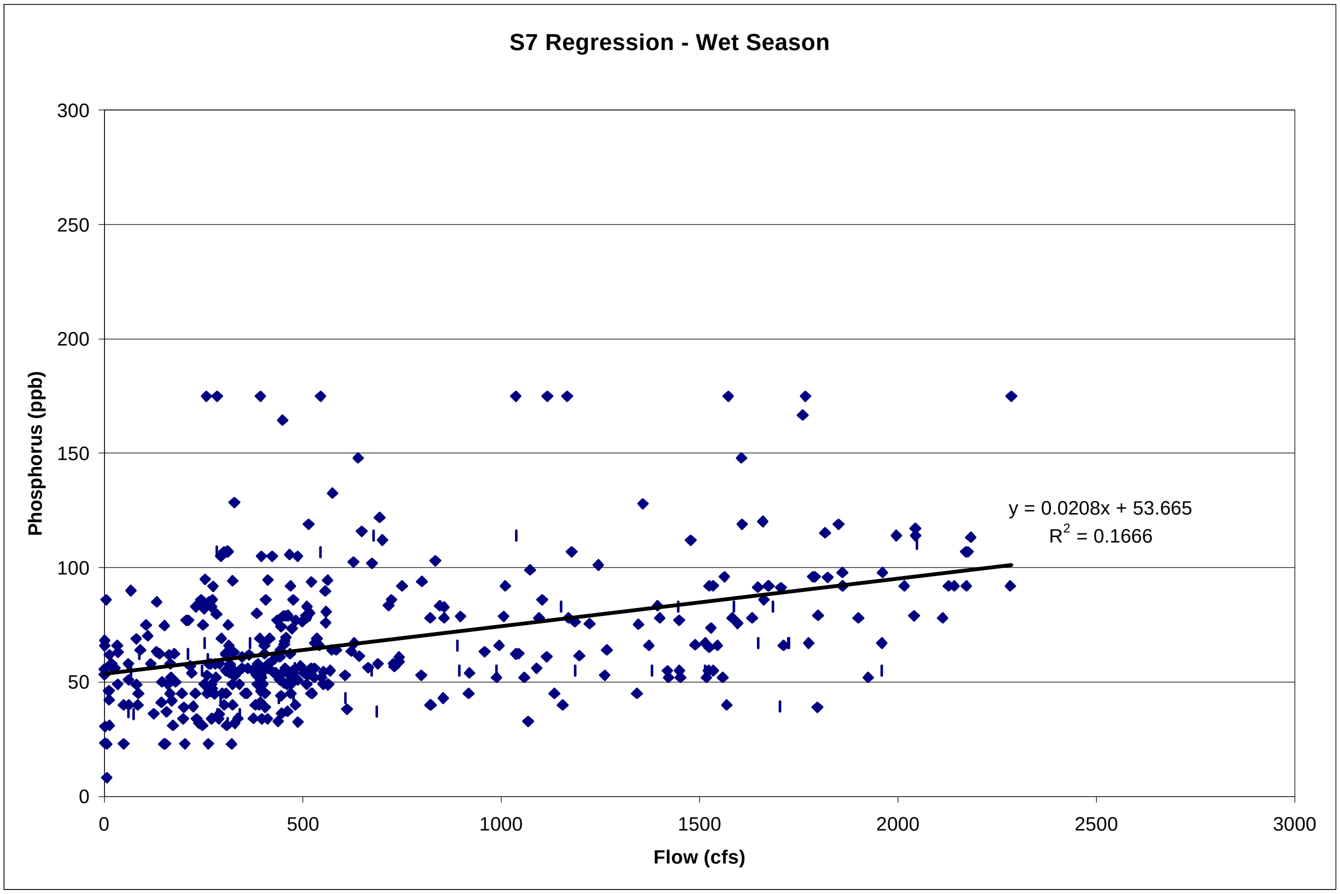
**Appendix 3-3 Figures (scatter plots)**

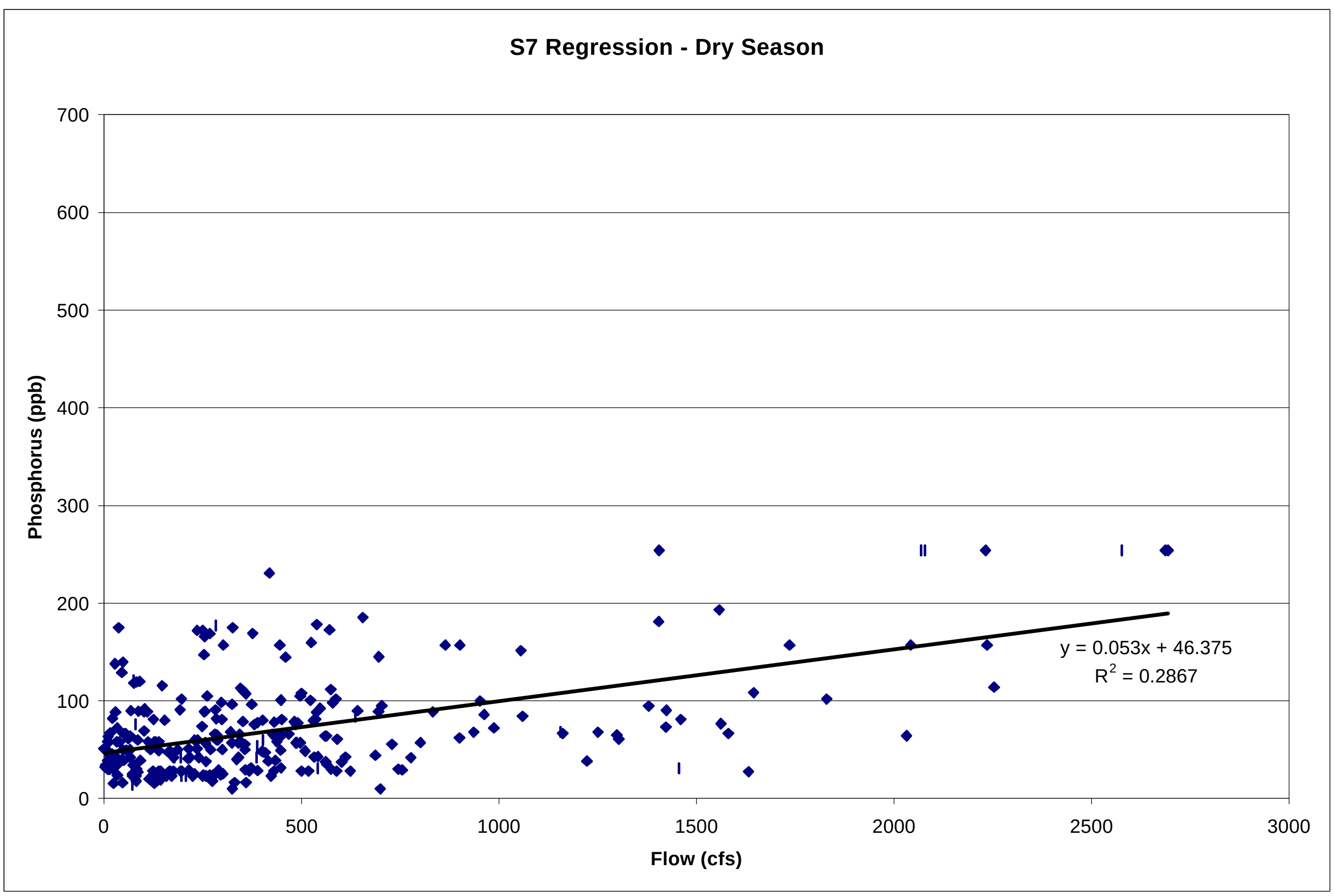


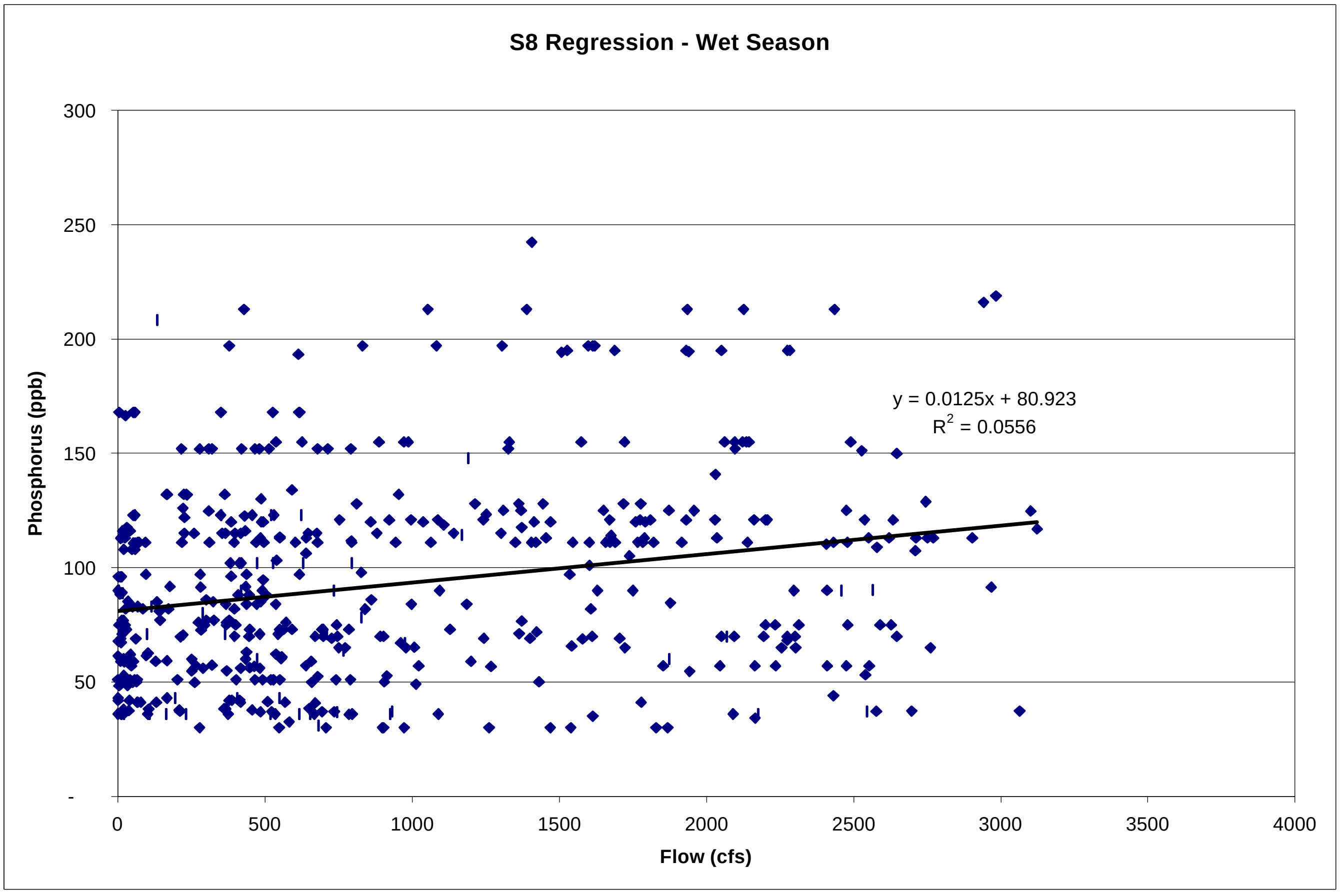



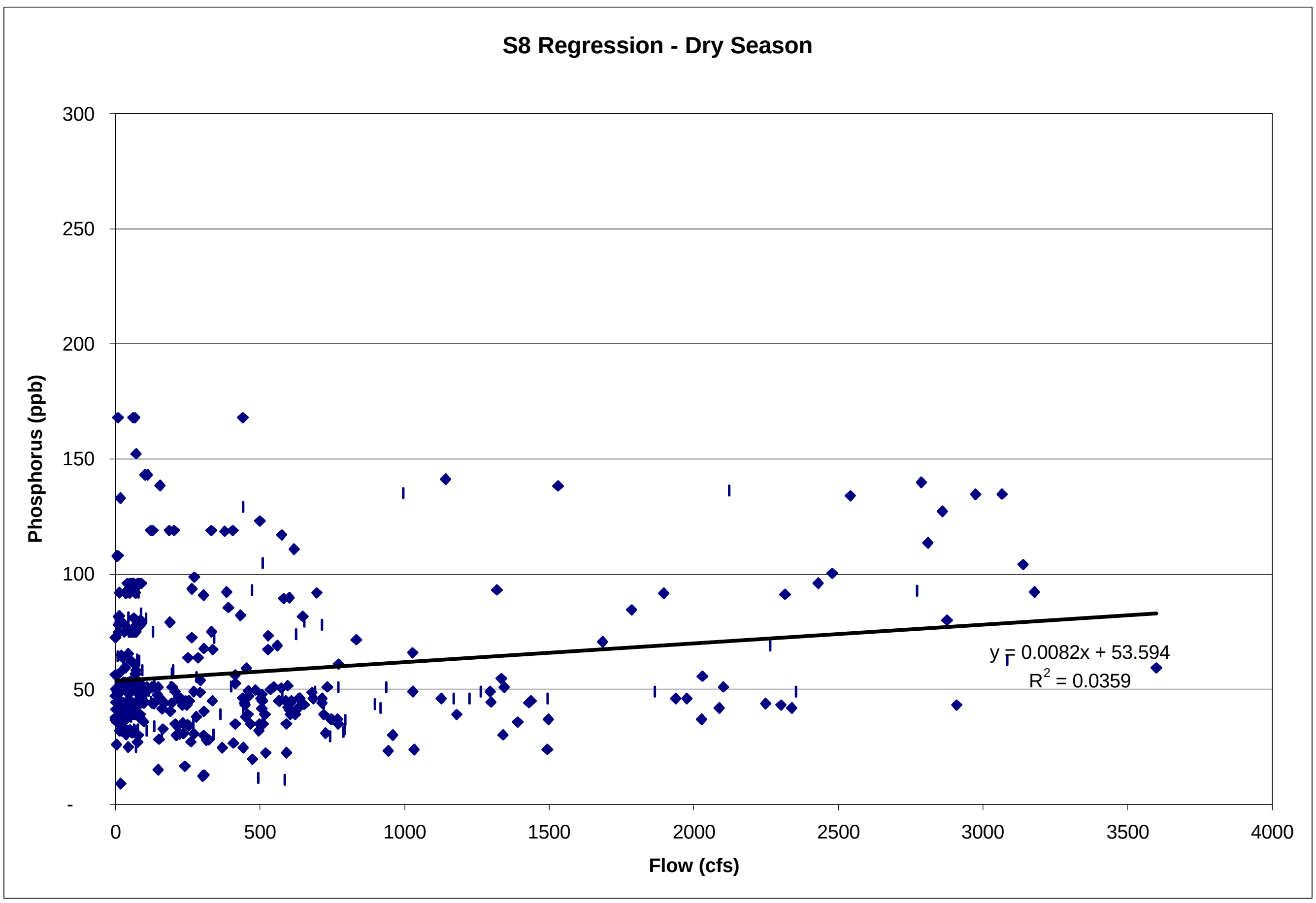

S-6 Regression Results - Wet Season
800
700
600
500
400
300
200
100
0
Phosphorus (ppb)
0
500
1000
1500
2000
2500
3000
Flow (cfs)
y = 0.0081x + 71.095
$R^2$ = 0.0355

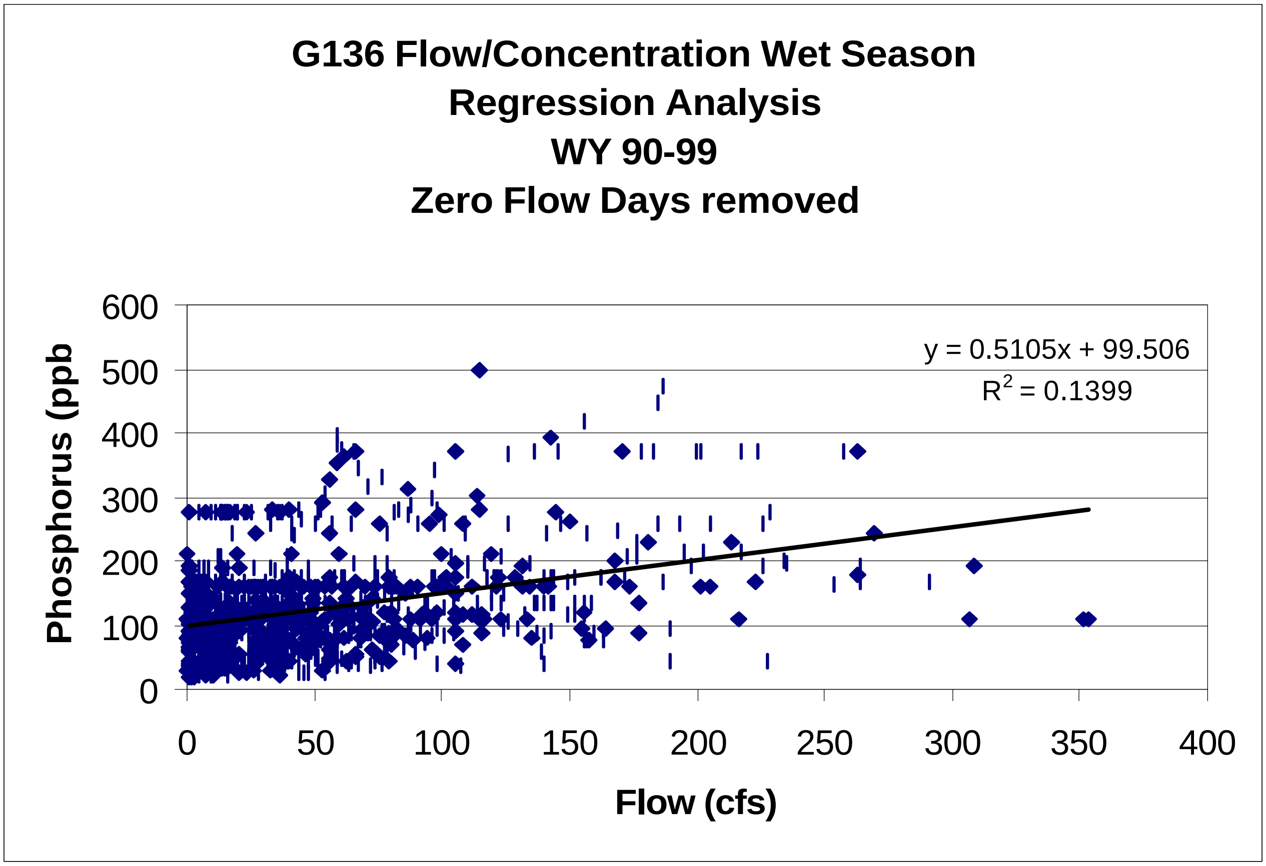

S-6 Regression Results - Dry Season
200
180
160
140
120
100
80
60
40
20
0
Phosphorus (ppb)
0
500
1000
1500
2000
2500
3000
Flow (cfs)
y = 0.0288x + 64.731
$R^2$ = 0.204

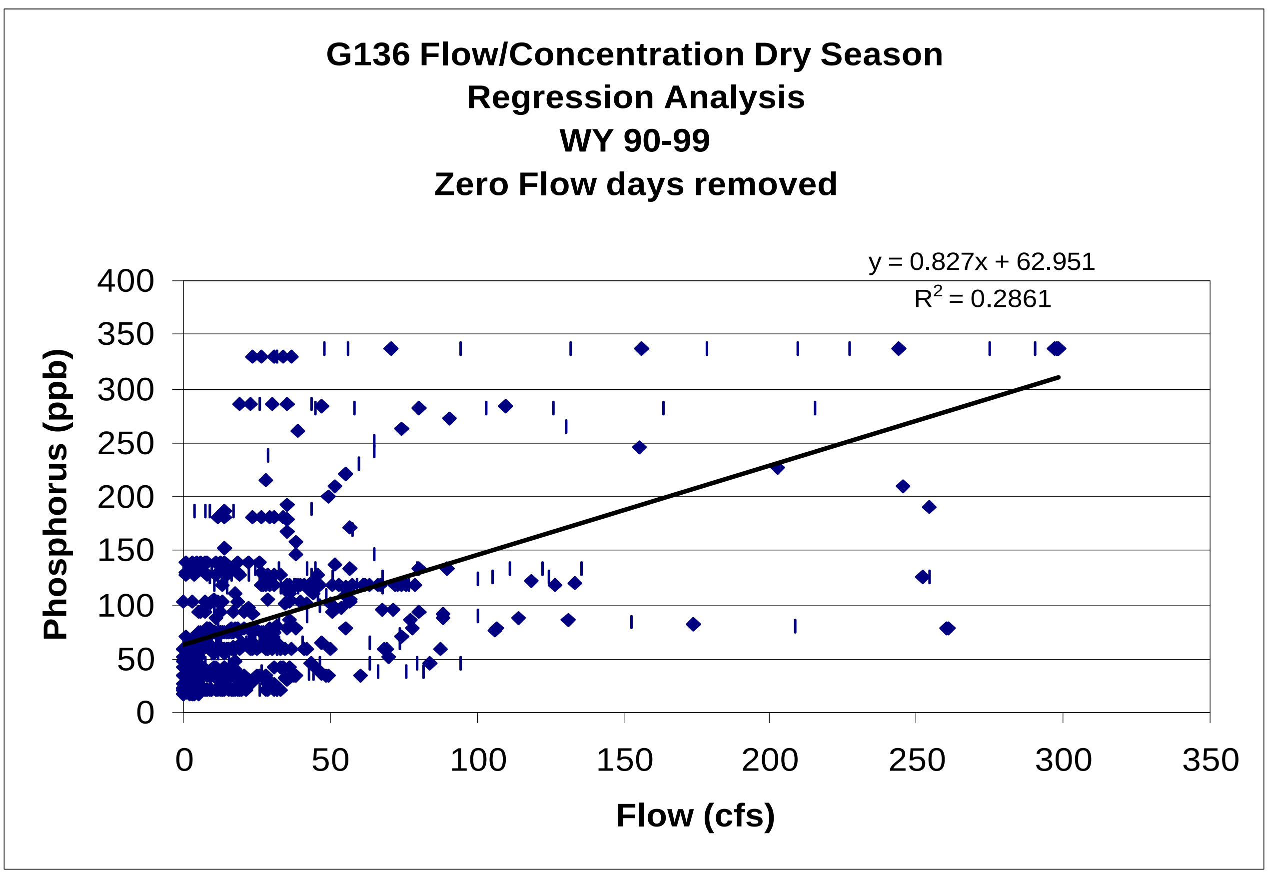

S7 Regression - Wet Season
Phosphorus (ppb)
Flow (cfs)
y = 0.0208x + 53.665
$R^2$ = 0.1666
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000

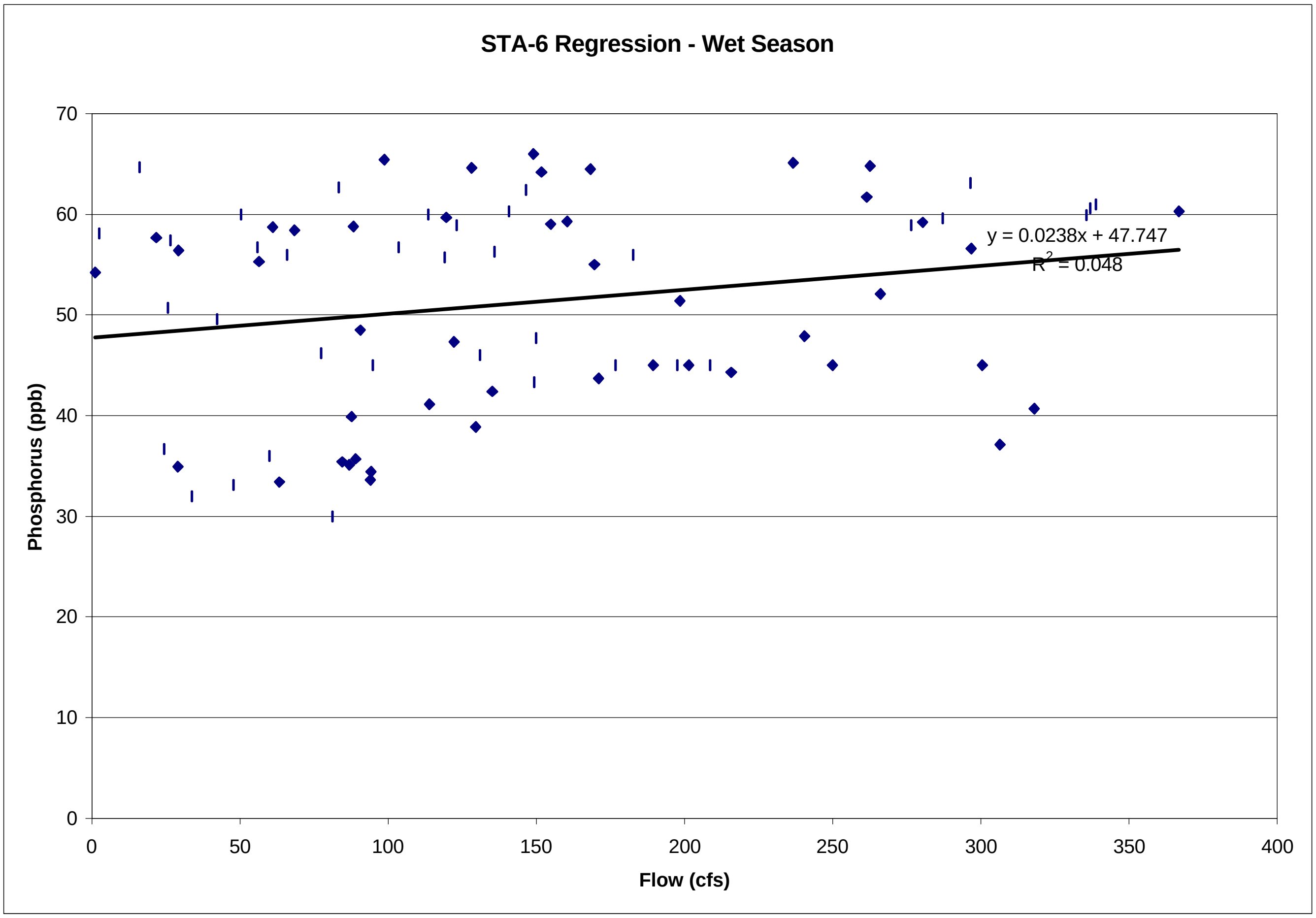

S7 Regression - Dry Season
Phosphorus (ppb)
Flow (cfs)
y = 0.053x + 46.375
$R^2$ = 0.2867
700
600
500
400
300
200
100
0
0
500
1000
1500
2000
2500
3000

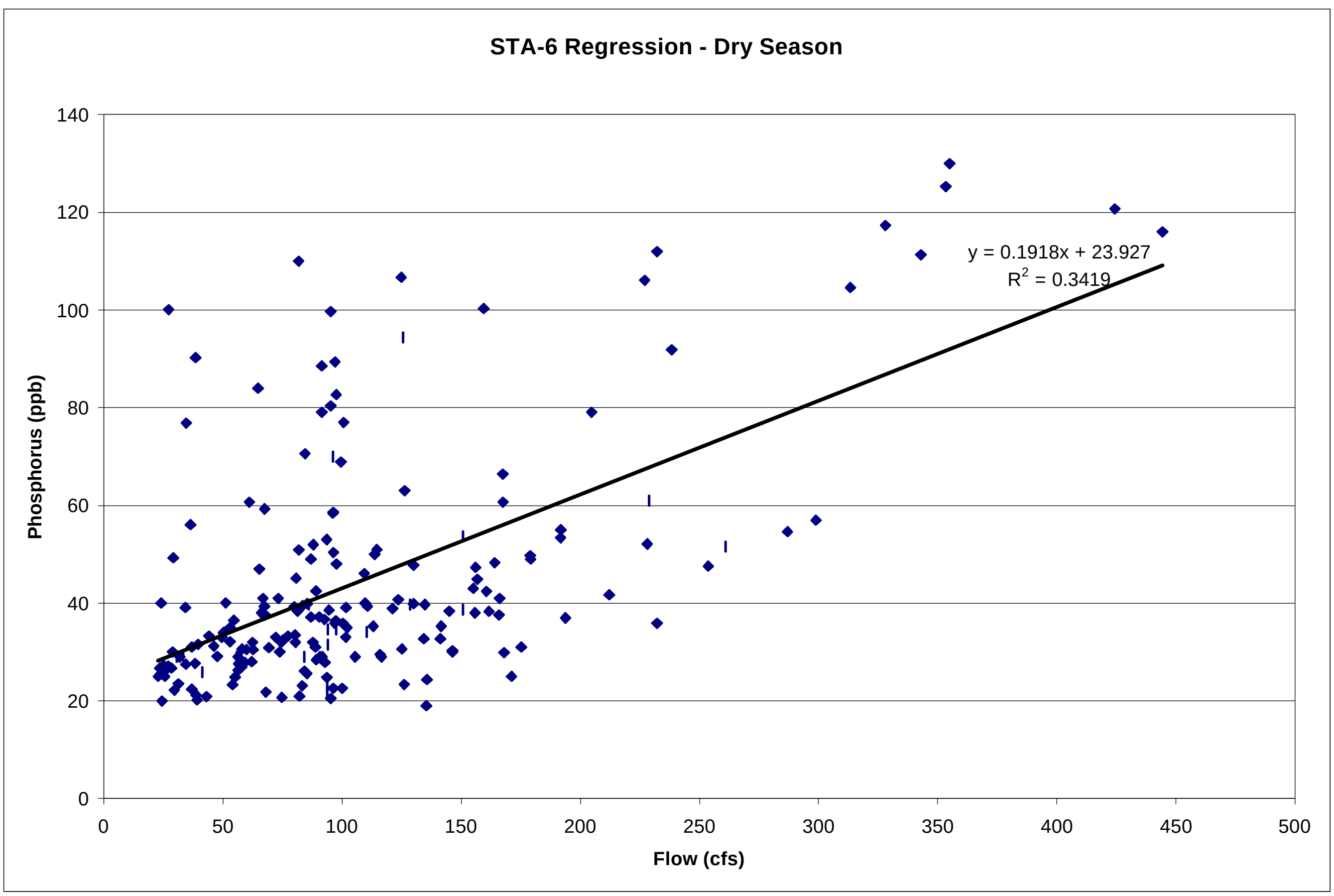

S8 Regression - Wet Season
Phosphorus (ppb)
Flow (cfs)
y = 0.0125x + 80.923
$R^2$ = 0.0556
300
250
200
150
100
50
-
0
500
1000
1500
2000
2500
3000
3500
4000

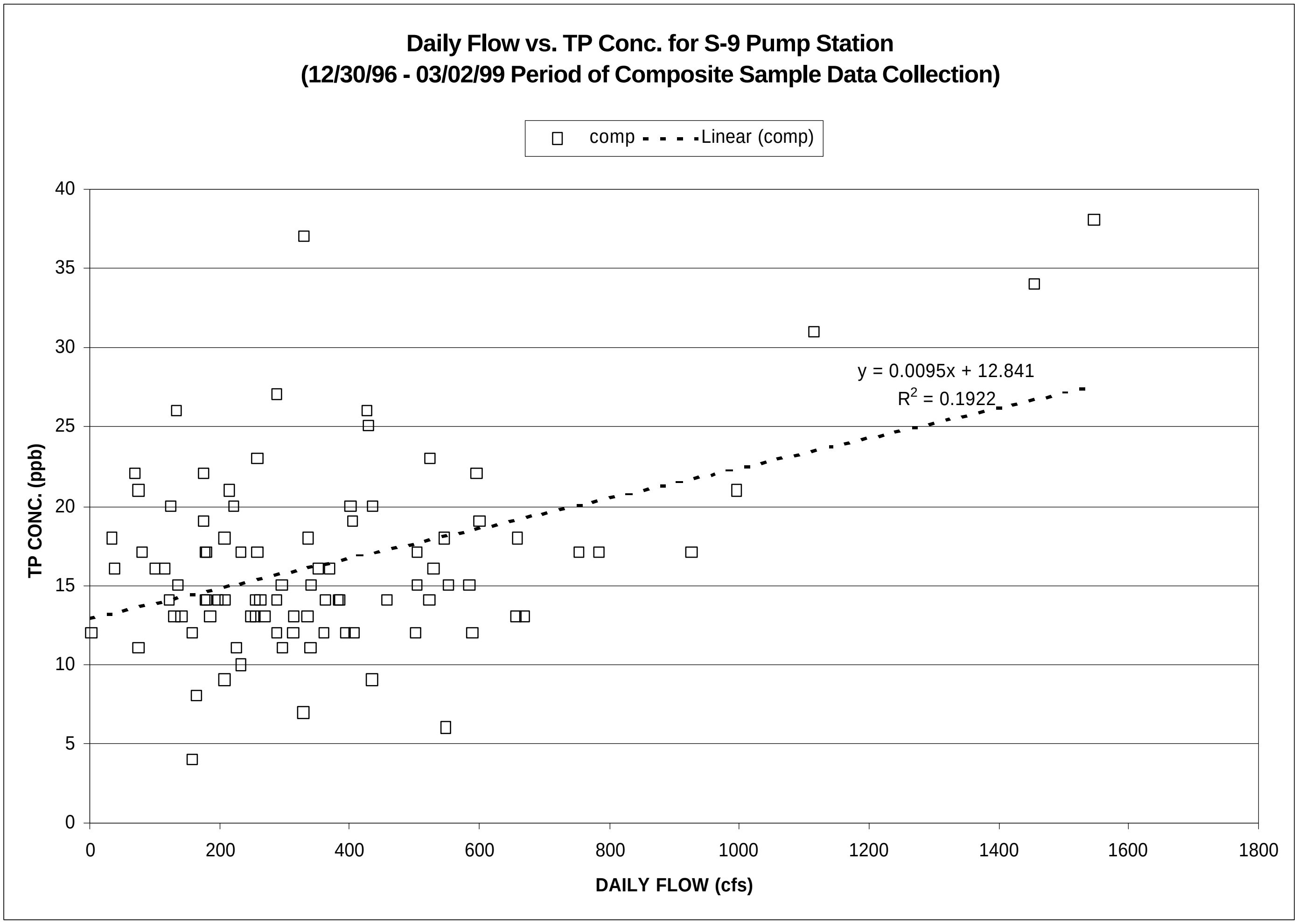

S8 Regression - Dry Season
Phosphorus (ppb)
Flow (cfs)
y = 0.0082x + 53.594
$R^2$ = 0.0359
300
250
200
150
100
50
-
0
500
1000
1500
2000
2500
3000
3500
4000

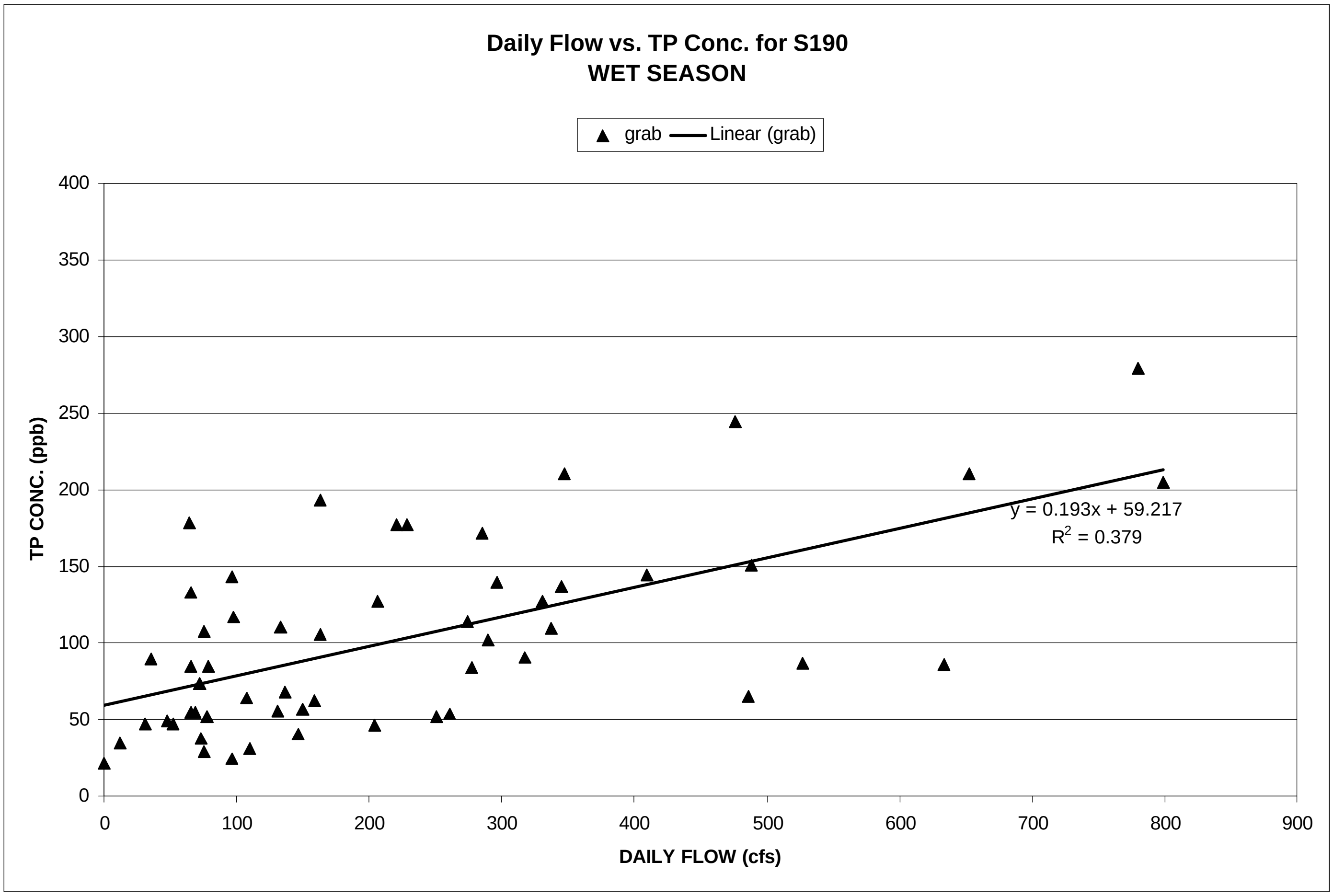

G136 Flow/Concentration Wet Season
Regression Analysis
WY 90-99
Zero Flow Days removed
y = 0.5105x + 99.506
$R^2$ = 0.1399
Phosphorus (ppb
0
100
200
300
400
500
600
0
50
100
150
200
250
300
350
400
Flow (cfs)

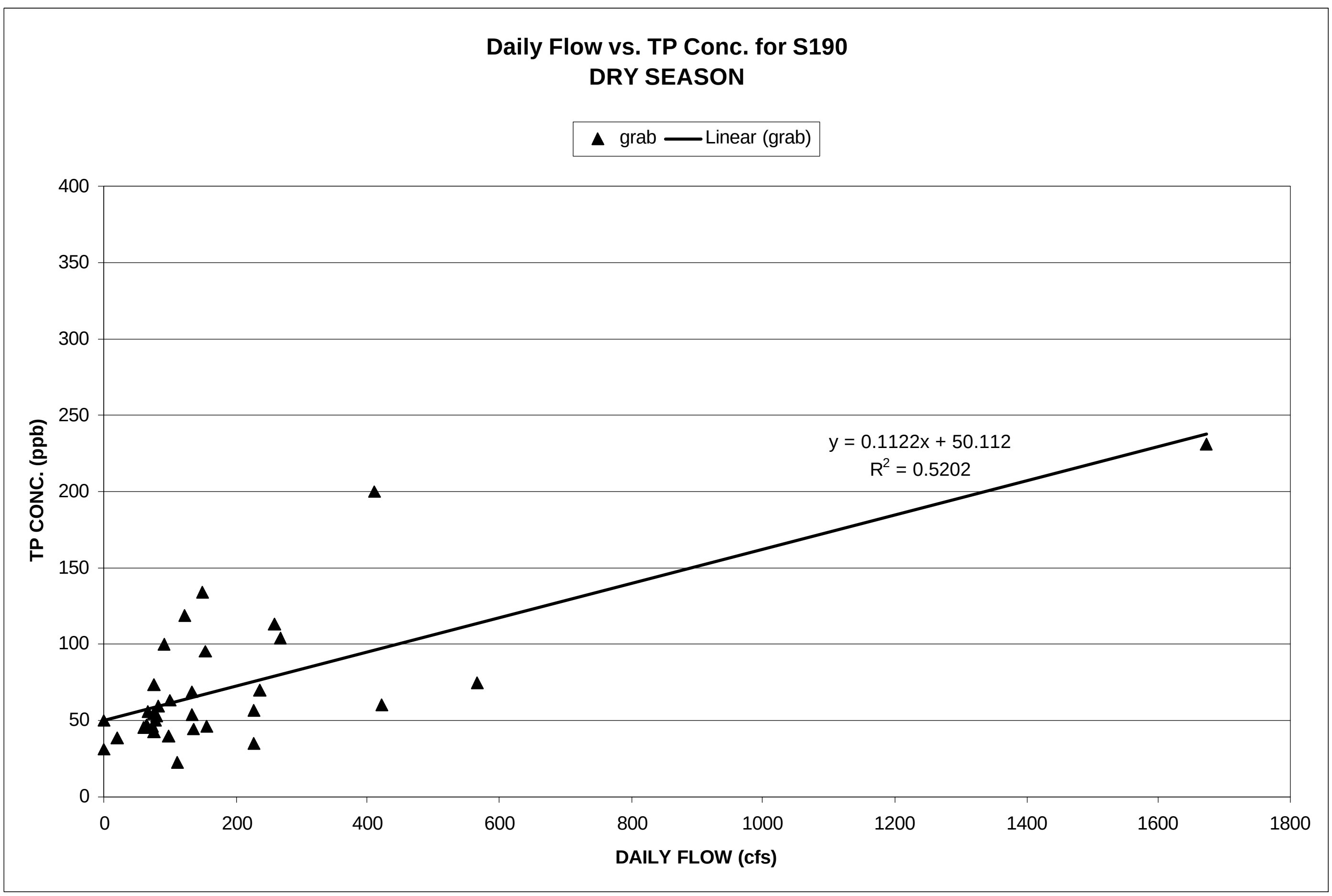

G136 Flow/Concentration Dry Season
Regression Analysis
WY 90-99
Zero Flow days removed
y = 0.827x + 62.951
$R^2$ = 0.2861
Phosphorus (ppb)
0
50
100
150
200
250
300
350
400
0
50
100
150
200
250
300
350
Flow (cfs)


STA-6 Regression - Wet Season
y = 0.0238x + 47.747
$R^2$ = 0.048
Phosphorus (ppb)
Flow (cfs)
0
10
20
30
40
50
60
70
0
50
100
150
200
250
300
350
400


STA-6 Regression - Dry Season
y = 0.1918x + 23.927
$R^2$ = 0.3419
Phosphorus (ppb)
Flow (cfs)
0
20
40
60
80
100
120
140
0
50
100
150
200
250
300
350
400
450
500


Daily Flow vs. TP Conc. for S-9 Pump Station
(12/30/96 - 03/02/99 Period of Composite Sample Data Collection)
comp
Linear (comp)
y = 0.0095x + 12.841
R2 = 0.1922
TP CONC. (ppb)
DAILY FLOW (cfs)
0
5
10
15
20
25
30
35
40
0
200
400
600
800
1000
1200
1400
1600
1800


Daily Flow vs. TP Conc. for S190
WET SEASON
grab
Linear (grab)
TP CONC. (ppb)
400
350
300
250
200
150
100
50
0
0
100
200
300
400
500
600
700
800
900
DAILY FLOW (cfs)
y = 0.193x + 59.217
R2 = 0.379


Daily Flow vs. TP Conc. for S190
DRY SEASON
grab
Linear (grab)
TP CONC. (ppb)
400
350
300
250
200
150
100
50
0
0
200
400
600
800
1000
1200
1400
1600
1800
DAILY FLOW (cfs)
y = 0.1122x + 50.112
R2 = 0.5202

**Appendix 5-1. Historic Flows and Loads - S-5A Basin**

| Water Year (May-April) | Basin Runoff Flow AF/yr | Basin Runoff Phosphorus kg/yr | Basin Runoff Phosphorus ppb | Lake Releases Flow AF/yr | Lake Releases Phosphorus kg/yr | Lake Releases Phosphorus ppb | Total Flows Flow AF/yr | Total Flows Phosphorus kg/yr | Total Flows Phosphorus ppb |
|---|---|---|---|---|---|---|---|---|---|
| **1990** | 143,956 | 25,275 | 142 | 23,158 | 4,147 | 145 | 167,114 | 29,422 | 143 |
| **1991** | 210,012 | 76,238 | 294 | - | - | - | 210,012 | 76,238 | 294 |
| **1992** | 179,887 | 35,754 | 161 | 3,979 | 423 | 86 | 183,866 | 36,177 | 159 |
| **1993** | 407,546 | 99,922 | 199 | 179,718 | 21,810 | 98 | 587,264 | 121,732 | 168 |
| **1994** | 281,300 | 72,023 | 208 | 444 | 62 | 113 | 281,744 | 72,085 | 207 |
| **1995** | 474,581 | 97,060 | 166 | 115,466 | 15,873 | 111 | 590,047 | 112,933 | 155 |
| **1996** | 331,544 | 64,238 | 157 | 169,866 | 27,113 | 129 | 501,410 | 91,351 | 148 |
| **1997** | 240,921 | 40,918 | 138 | 54,884 | 11,243 | 166 | 295,805 | 52,161 | 143 |
| **1998** | 318,848 | 72,428 | 184 | 66,815 | 18,908 | 229 | 385,663 | 91,336 | 192 |
| **1999** | 195,348 | 42,059 | 175 | 125,462 | 28,511 | 184 | 320,810 | 70,570 | 178 |
| **Total** | 2,783,942 | 625,916 | 182 | 739,792 | 128,090 | 140 | 3,523,734 | 754,006 | 173 |
| **Average** | 278,394 | 62,592 | 182 | 73,979 | 12,809 | 140 | 352,373 | 75,401 | 173 |
| **4-yr Average** | 271,665 | 54,911 | 164 | 104,256 | 21,444 | 167 | 375,922 | 76,355 | 165 |
| **Minimum** | 143,956 | 25,275 | 138 | - | - | 86 | 167,114 | 29,422 | 143 |
| **Maximum** | 474,581 | 99,922 | 294 | 179,718 | 28,511 | 229 | 590,047 | 121,732 | 294 |

**Appendix 6-1. Historic Flows and Loads - S-6 Basin**

| | Basin Runoff | | | Lake Releases | | | Total Flows | | |
|---|---|---|---|---|---|---|---|---|---|
| Water Year (May-April) | Flow AF/yr | Phosphorus kg/yr | Phosphorus ppb | Flow AF/yr | Phosphorus kg/yr | Phosphorus ppb | Flow AF/yr | Phosphorus kg/yr | Phosphorus ppb |
| 1990 | 62,072 | 11,720 | 153 | - | - | - | 62,072 | 11,720 | 153 |
| 1991 | 125,343 | 23,712 | 153 | 778 | 67 | 70 | 126,121 | 23,779 | 153 |
| 1992 | 209,900 | 16,784 | 65 | 782 | 67 | 70 | 210,681 | 16,851 | 65 |
| 1993 | 357,890 | 61,296 | 139 | 131,967 | 13,242 | 81 | 489,856 | 74,539 | 123 |
| 1994 | 228,763 | 15,809 | 56 | 324 | 19 | 48 | 229,087 | 15,828 | 56 |
| 1995 | 542,201 | 62,402 | 93 | 81,212 | 6,897 | 69 | 623,412 | 69,299 | 90 |
| 1996 | 368,082 | 35,737 | 79 | 61,515 | 4,341 | 57 | 429,597 | 40,078 | 76 |
| 1997 | 244,560 | 22,787 | 76 | 6,987 | 751 | 87 | 251,547 | 23,538 | 76 |
| 1998 | 328,348 | 40,635 | 100 | 22,920 | 2,505 | 89 | 351,268 | 43,139 | 100 |
| 1999 | 188,377 | 23,999 | 103 | 27,375 | 2,652 | 79 | 215,752 | 26,651 | 100 |
| **Total** | 2,655,534 | 314,880 | 96 | 333,860 | 30,541 | 74 | 2,989,394 | 345,422 | 94 |
| **Average** | 265,553 | 31,488 | 96 | 33,386 | 3,054 | 74 | 298,939 | 34,542 | 94 |
| **4-yr Average** | 282,342 | 30,789 | 88 | 29,699 | 2,562 | 70 | 312,041 | 33,352 | 87 |
| **Minimum** | 62,072 | 11,720 | 56 | - | - | 48 | 62,072 | 11,720 | 56 |
| **Maximum** | 542,201 | 62,402 | 153 | 131,967 | 13,242 | 89 | 623,412 | 74,539 | 153 |

**Appendix 7-1. Historic Flows and Loads - S-7 Basin**

| Water Year (May-April) | Basin Runoff Flow AF/yr | Basin Runoff Phosphorus kg/yr | Basin Runoff Phosphorus ppb | Lake Releases Flow AF/yr | Lake Releases Phosphorus kg/yr | Lake Releases Phosphorus ppb | Total Flows Flow AF/yr | Total Flows Phosphorus kg/yr | Total Flows Phosphorus ppb |
|---|---|---|---|---|---|---|---|---|---|
| 1990 | 224,179 | 31,142 | 113 | 244,672 | 23,729 | 79 | 468,851 | 54,871 | 95 |
| 1991 | 179,102 | 23,596 | 107 | 10,741 | 1,289 | 97 | 189,842 | 24,885 | 106 |
| 1992 | 284,244 | 26,438 | 75 | 125,407 | 8,497 | 55 | 409,651 | 34,935 | 69 |
| 1993 | 390,473 | 48,854 | 101 | 345,675 | 26,967 | 63 | 736,148 | 75,821 | 83 |
| 1994 | 237,259 | 22,188 | 76 | 4,293 | 405 | 77 | 241,553 | 22,593 | 76 |
| 1995 | 349,465 | 40,544 | 94 | 105,474 | 7,333 | 56 | 454,939 | 47,877 | 85 |
| 1996 | 237,282 | 19,977 | 68 | 99,657 | 13,682 | 111 | 336,940 | 33,659 | 81 |
| 1997 | 201,174 | 21,479 | 87 | 34,753 | 2,699 | 63 | 235,928 | 24,179 | 83 |
| 1998 | 220,518 | 21,701 | 80 | 1,461 | 134 | 74 | 221,979 | 21,835 | 80 |
| 1999 | 163,167 | 23,270 | 116 | 89,405 | 8,536 | 77 | 252,572 | 31,806 | 102 |
| **Total** | 2,486,863 | 279,190 | 91 | 1,061,539 | 93,272 | 71 | 3,548,402 | 372,461 | 85 |
| **Average** | 248,686 | 27,919 | 91 | 106,154 | 9,327 | 71 | 354,840 | 37,246 | 85 |
| **4-yr Average** | 205,535 | 21,607 | 85 | 56,319 | 6,263 | 90 | 261,855 | 27,870 | 86 |
| **Minimum** | 163,167 | 19,977 | 68 | 1,461 | 134 | 55 | 189,842 | 21,835 | 69 |
| **Maximum** | 390,473 | 48,854 | 116 | 345,675 | 26,967 | 111 | 736,148 | 75,821 | 106 |

**Appendix 7-2. Historic Flows and Loads - S-8 Basin**

| Water Year (May-April) | Basin Runoff Flow AF/yr | Basin Runoff Phosphorus kg/yr | Basin Runoff Phosphorus ppb | Lake Releases Flow AF/yr | Lake Releases Phosphorus kg/yr | Lake Releases Phosphorus ppb | Total Flows Flow AF/yr | Total Flows Phosphorus kg/yr | Total Flows Phosphorus ppb |
|---|---|---|---|---|---|---|---|---|---|
| **1990** | 85,766 | 21,231 | 201 | 50,265 | 4,605 | 74 | 136,030 | 25,836 | 154 |
| **1991** | 108,122 | 25,623 | 192 | 6,211 | 356 | 47 | 114,332 | 25,980 | 184 |
| **1992** | 259,723 | 30,339 | 95 | 35,992 | 2,096 | 47 | 295,715 | 32,435 | 89 |
| **1993** | 425,292 | 66,818 | 127 | 395,310 | 29,377 | 60 | 820,601 | 96,195 | 95 |
| **1994** | 236,854 | 29,791 | 102 | 29,553 | 2,169 | 59 | 266,407 | 31,960 | 97 |
| **1995** | 454,974 | 71,180 | 127 | 29,272 | 2,399 | 66 | 484,246 | 73,578 | 123 |
| **1996** | 349,917 | 49,476 | 115 | 38,262 | 4,795 | 102 | 388,179 | 54,271 | 113 |
| **1997** | 329,455 | 36,291 | 89 | 54,004 | 4,498 | 68 | 383,459 | 40,789 | 86 |
| **1998** | 404,520 | 29,821 | 60 | 16,545 | 1,408 | 69 | 421,066 | 31,229 | 60 |
| **1999** | 216,012 | 30,066 | 113 | 136,620 | 13,382 | 79 | 352,632 | 43,448 | 100 |
| **Total** | 2,870,634 | 390,636 | 110 | 792,034 | 65,085 | 67 | 3,662,668 | 455,721 | 101 |
| **Average** | 287,063 | 39,064 | 110 | 79,203 | 6,509 | 67 | 366,267 | 45,572 | 101 |
| **4-yr Average** | 324,976 | 36,413 | 91 | 61,358 | 6,021 | 80 | 386,334 | 42,434 | 89 |
| **Minimum** | 85,766 | 21,231 | 60 | 6,211 | 356 | 47 | 114,332 | 25,836 | 60 |
| **Maximum** | 454,974 | 71,180 | 201 | 395,310 | 29,377 | 102 | 820,601 | 96,195 | 184 |

**Appendix 8-1. Historic Flows and Loads - C-139 Basin**

| | L3 | | | G136 | | |
|---|---|---|---|---|---|---|
| **Water Year (May - April)** | **Flow AF/yr** | **Phosphorus kg/yr** | **Phosphorus ppb** | **Flow AF/yr** | **Phosphorus kg/yr** | **Phosphorus ppb** |
| **1990** | 44,391 | 5,304 | 97 | 1,249 | 172 | 112 |
| **1991** | 41,843 | 4,663 | 90 | 3,498 | 328 | 76 |
| **1992** | 91,305 | 11,271 | 100 | 8,483 | 995 | 95 |
| **1993** | 125,623 | 24,063 | 155 | 11,671 | 2,211 | 154 |
| **1994** | 116,360 | 18,797 | 131 | 20,114 | 2,952 | 119 |
| **1995** | 236,270 | 56,337 | 193 | 35,987 | 5,554 | 125 |
| **1996** | 214,972 | 45,046 | 170 | 20,791 | 3,440 | 134 |
| **1997** | 151,443 | 42,614 | 228 | 13,091 | 2,471 | 153 |
| **1998** | 149,156 | 30,244 | 164 | 20,777 | 5,389 | 210 |
| **1999** | 122,059 | 31,400 | 209 | 13,735 | 4,179 | 247 |
| **Total** | 1,293,420 | 269,739 | 169 | 149,395 | 27,692 | 150 |
| **Average** | 129,342 | 26,974 | 169 | 14,939 | 2,769 | 150 |
| **Minimum** | 41,843 | 4,663 | 90 | 1,249 | 172 | 76 |
| **Maximum** | 236,270 | 56,337 | 228 | 35,987 | 5,554 | 247 |

**Appendix 9-1. Historic Flows and Loads - STA-6**

| | Inflow | | | Outflow | | |
|---|---|---|---|---|---|---|
| **Water Year (May-April)** | **Flow AF/yr** | **Phosphorus kg/yr** | **Phosphorus ppb** | **Flow AF/yr** | **Phosphorus kg/yr** | **Phosphorus ppb** |
| **1990** | - | - | - | - | - | - |
| **1991** | - | - | - | - | - | - |
| **1992** | - | - | - | - | - | - |
| **1993** | - | - | - | - | - | - |
| **1994** | - | - | - | - | - | - |
| **1995** | - | - | - | - | - | - |
| **1996** | - | - | - | - | - | - |
| **1997** | - | - | - | - | - | - |
| **1998** | 26,101 | 1,631 | 51 | 23,984 | 484 | 16 |
| **1999** | 40,119 | 3,037 | 61 | 24,035 | 657 | 22 |
| **Total** | 66,221 | 4,668 | 57 | 48,019 | 1,141 | 19 |
| **Average** | 46,744 | 3,295 | 57 | 33,896 | 805 | 19 |
| **4-yr Average** | 46,744 | 3,295 | 57 | 33,896 | 805 | 19 |
| **Minimum** | 40,119 | 3,037 | 61 | 24,035 | 657 | 22 |
| **Maximum** | 40,119 | 3,037 | 61 | 24,035 | 657 | 22 |

**Notes:**

1. **STA-6 began flow-through operation in December 1997.**
2. **STA-6 outflows are included in S-8 basin flows.**

**Appendix 10-1. Historic Flows and Phosphorus - Acme Basin B**

| Water Year (May-April) | L40-1 Flow AF/yr | L40-1 Phosphorus kg/yr | L40-1 Phosphorus ppb | L40-2 Flow AF/yr | L40-2 Phosphorus kg/yr | L40-2 Phosphorus ppb | Total Flow AF/yr | Total Phosphorus kg/yr | Total Phosphorus ppb |
|---|---|---|---|---|---|---|---|---|---|
| **1990** | 2,894 | 640 | 179 | 2,503 | 343 | 111 | 5,397 | 983 | 148 |
| **1991** | 17,018 | 1,231 | 59 | 13,780 | 2,450 | 144 | 30,798 | 3,681 | 97 |
| **1992** | 25,134 | 1,606 | 52 | 22,501 | 1,136 | 41 | 47,635 | 2,742 | 47 |
| **1993** | 35,085 | 1,591 | 37 | 31,064 | 2,439 | 64 | 66,149 | 4,029 | 49 |
| **1994** | 10,666 | 848 | 64 | 12,454 | 1,260 | 82 | 23,120 | 2,108 | 74 |
| **1995** | 28,317 | 2,415 | 69 | 26,630 | 3,622 | 110 | 54,947 | 6,038 | 89 |
| **1996** | 22,172 | 4,841 | 177 | 22,244 | 4,800 | 175 | 44,416 | 9,641 | 176 |
| **1997** | 17,168 | 1,421 | 67 | 12,911 | 1,346 | 85 | 30,079 | 2,767 | 75 |
| **1998** | 26,393 | 2,972 | 91 | 20,898 | 2,597 | 101 | 47,291 | 5,569 | 95 |
| **1999** | 19,776 | 3,594 | 147 | 16,930 | 3,761 | 180 | 36,705 | 7,355 | 162 |
| **Total** | 204,622 | 21,158 | 84 | 181,916 | 23,755 | 106 | 386,538 | 44,913 | 94 |
| **Average** | 20,462 | 2,116 | 84 | 18,192 | 2,375 | 106 | 38,654 | 4,491 | 94 |
| **Minimum** | 2,894 | 640 | 37 | 2,503 | 343 | 41 | 5,397 | 983 | 47 |
| **Maximum** | 35,085 | 4,841 | 179 | 31,064 | 4,800 | 180 | 66,149 | 9,641 | 176 |

**Appendix 11-1. Historic Flows and Phosphorus - NSID Basin**

| Water Year (May-April) | Flow AF/yr | Phosphorus kg/yr | Phosphorus ppb |
|---|---|---|---|
| **1990** | 239 | 4 | 13 |
| **1991** | 12,059 | 280 | 19 |
| **1992** | 10,421 | 249 | 19 |
| **1993** | 7,797 | 471 | 49 |
| **1994** | 5,146 | 201 | 32 |
| **1995** | 10,807 | 810 | 61 |
| **1996** | 5,005 | 456 | 74 |
| **1997** | 1,970 | 172 | 71 |
| **1998** | 7,364 | 344 | 38 |
| **1999** | 6,757 | 225 | 27 |
| **Total** | 67,566 | 3,213 | 39 |
| **Average** | 6,757 | 321 | 39 |
| **Minimum** | 239 | 4 | 13 |
| **Maximum** | 12,059 | 810 | 74 |

**Appendix 13-1. Historic Flows and Phosphorus - C-11 West Basin (S-9 Pump Station)**

| Water Year (May-April) | Flow AF/yr | Phosphorus kg/yr | Phosphorus ppb |
|---|---|---|---|
| **1990** | 72,674 | 1,812 | 20 |
| **1991** | 118,368 | 2,224 | 15 |
| **1992** | 201,577 | 3,682 | 15 |
| **1993** | 251,164 | 5,002 | 16 |
| **1994** | 182,903 | 3,290 | 15 |
| **1995** | 320,621 | 5,467 | 14 |
| **1996** | 239,292 | 4,571 | 15 |
| **1997** | 242,415 | 4,519 | 15 |
| **1998** | 250,342 | 5,347 | 17 |
| **1999** | 221,414 | 5,197 | 19 |
| **Total** | 2,100,771 | 41,112 | 16 |
| **Average** | 210,077 | 4,111 | 16 |
| **Minimum** | 72,674 | 1,812 | 14 |
| **Maximum** | 320,621 | 5,467 | 20 |

**Appendix 14-1. Historic Flows and Phosphorus - L-28 Basin (S-140 Pump Station)**

| Water Year (May-April) | Flow AF/yr | Phosphorus kg/yr | Phosphorus ppb |
|---|---|---|---|
| **1990** | 50,079 | 3,383 | 55 |
| **1991** | 45,888 | 2,385 | 42 |
| **1992** | 124,860 | 5,704 | 37 |
| **1993** | 139,820 | 5,737 | 33 |
| **1994** | 82,701 | 3,132 | 31 |
| **1995** | 238,707 | 9,447 | 32 |
| **1996** | 133,966 | 7,188 | 43 |
| **1997** | 101,975 | 5,180 | 41 |
| **1998** | 155,848 | 6,994 | 36 |
| **1999** | 94,479 | 6,362 | 55 |
| **Total** | 1,168,323 | 55,511 | 39 |
| **Average** | 116,832 | 5,551 | 39 |
| **Minimum** | 45,888 | 2,385 | 31 |
| **Maximum** | 238,707 | 9,447 | 55 |

**Appendix 15-1. Historic Flows and Phosphorus - Feeder Canal Basin (S-190)**

| Water Year (May-April) | Flow AF/yr | Phosphorus kg/yr | Phosphorus ppb |
|---|---|---|---|
| **1990** | 20,121 | 2,568 | 103 |
| **1991** | 17,894 | 1,743 | 79 |
| **1992** | 106,830 | 20,900 | 159 |
| **1993** | 121,224 | 11,622 | 78 |
| **1994** | 57,843 | 8,853 | 124 |
| **1995** | 199,787 | 32,589 | 132 |
| **1996** | 95,118 | 15,610 | 133 |
| **1997** | 61,073 | 9,898 | 131 |
| **1998** | 70,317 | 6,995 | 81 |
| **1999** | 47,467 | 4,446 | 76 |
| **Total** | 797,674 | 115,222 | 117 |
| **Average** | 79,767 | 11,522 | 117 |
| **Minimum** | 17,894 | 1,743 | 76 |
| **Maximum** | 199,787 | 32,589 | 159 |

## Appendix 16-1

## May 2001 Report Revisions
## Baseline Data for the Basin-Specific Feasibility Studies to Achieve the Long-term Water Quality Goals for the Everglades

### I. General Revisions

A. Revised Simulated Flows

ALT1, the SFWMM simulation run which provided the flows for the May 2000 Baseline Data report, was subsequently revised to refine the manner in which some basins and STA components were modeled. A new simulation run, BASERR1, was completed in December 2000. With BASERR1, several key refinements were made to the ALT1 simulation:

- The basin runoff transfers for STA-1E and STA-1W were not properly accounted for in the ALT1 simulation. This was corrected in BASERR1.
- The ALT1 simulation did not include STA-6 Section 2, which we felt should be included in analyses performed for the purpose of long-term water quality planning. STA-6 Section 2 was therefore added to the BASERR1 run.
- BASERR1 revised the manner in which NSID Basin runoff was simulated. The ALT1 NSID Basin flows were estimated as a function of total simulated runoff in the model grid cells representing NSID. The pumps that divert part of this runoff were not explicitly modeled in ALT1. A scaling factor was applied to the total simulated runoff such that historic flow data can be reasonably matched. With BASERR1, the flows from NSID to WCA-2A were explicitly modeled. The simulated annual average discharge of 6,168 acre-feet for the period of record 65-95 is in line with the historic (WY 90-99) average annual flow of 6,757 acre-feet.
- Revised topographic information for the Rotenberger Wildlife Management Area was incorporated into BASERR1. This topographic data update was part of a mid-2000 interagency effort to refine the interim operating schedule for the Rotenberger.
- The extent of the C-11W Basin was expanded from ALT1 to BASERR1 to more accurately represent S-9 pumpage from this basin to WCA-3A.

BASERR1 produced revised 31-year flow data sets for all of the basins and STAs except the Feeder Canal Basin since inflow to this basin is primarily input boundary conditions in the model and thus, did not change. Although the flows for some STAs and basins changed only slightly in the revised simulation, for consistency, the baseline data sets for all STAs and basins (with the exception of the Feeder Canal Basin) were revised in the May 2001 Baseline Data report.

B. Revised Historic Flow Data

Following completion of the May 2000 Baseline Data report, the 10-year historic flow data sets for two basins, Acme Basin B and the C-139 Basin, were revised.

Flow/concentration regression relationships were performed for the revised historic data sets and the results were analyzed to determine whether regression relationships or flow-weighted mean concentrations should be used to develop the 31-year daily data sets. The results are described in the following sections.

## II. Section Revisions

Section 1 – Executive Summary

Table 1-1 was revised to reflect the revised flows and loads presented in the individual basin/STA sections of the report.

The term "C & SF Project Restudy" was replaced with the term "Comprehensive Everglades Restoration Plan or CERP" throughout the text.

The text about the completion date for the feasibility studies was changed from December 2001 to June 2002.

Section 2 - Introduction

A note was added that two of the Everglades Stormwater Program basins, C-111 Basin and Boynton Farms Basin, will be addressed through other District programs.

Figure 2-2 was revised to replace "C & SF Project Restudy" with "CERP". The "Feasibility studies and conceptual designs" activity note was changed to read "this report begins this effort".

The paragraph about legislative and permit-related deadlines was revised. The first item about submitting the final strategy to the Army Corps, the DEP and others was deleted since the item has been completed. The second item about STA-2 discharges was deleted because it was revised in a revision to the Army Corps 404 permit.

The schematic (Figure 2-3) and the text about the steps leading up to the completion of the basin-specific conceptual designs were revised.

Section 3 - Methodology

The statement that NSID Basin needed additional analyses to develop the baseline flow data set was removed from the "Flow" section of the report since BASERR1 simulated flows for NSID were more in line with the historic flow data.

The "Flow" section was revised to include a note that the BASERR1 simulation corrected the discrepancies between historic and simulated data in the ALT 1 simulation.

The "Combining Flow with Phosphorus Data" section including Table 3-1 was revised to reflect changes in the Acme historic data set and the C-139 historic data set. Reference to the "draft baseline data report" was changed to read "November 1999 draft baseline data report."

Table 3-2 was revised to reflect the revised STA outflow coefficients for the BASERR1 inflow and outflow data sets. In the May 2001 document, the procedure used to develop the ratio for calculating the outflow loads was modified for STA-5 and STA-6. For a complete description of the procedure used for these two STAs, refer to the individual report sections.

Section 4 – STA-1East
The simulated inflow and outflow daily data sets were revised using the results of the BASERR1 simulation.

Spreadsheet "sta1e_out tp.xls" was revised to correct errors in load calculations. Specifically, there were three problems: 1) Outflow loads were included on days when there were no outflows but there were inflow loads. 2) Outflow loads were not included on days when there were outflows but there were no inflow loads. 3) Some concentration calculations were inordinately high on some days when inflow loads/volumes were much higher than outflow loads/volumes (e.g., concentration values as high as 39,081 ppb). Outflow concentrations were capped at 200 ppb.

The spreadsheet formulas used to calculate some of the annual flows and loads in Tables 4-1 and 4-2 were corrected.

Table 4-1, Table 4-2, Figure 4-2, and Figure 4-3 were revised.

Section 5 – STA-1West
The simulated inflow and outflow daily data sets were revised using the results of the BASERR1 simulation.

Spreadsheet "sta1w_out tp.xls" was revised to correct errors in load calculations. Specifically, there were three problems: 1) Outflow loads were included on days when there were no outflows but there were inflow loads. 2) Outflow loads were not included on days when there were outflows but there were no inflow loads. 3) Some concentration calculations were inordinately high on some days when inflow loads/volumes were much higher than outflow loads. Outflow concentrations were capped at 200 ppb.

The spreadsheet formulas used to calculate some of the annual flows and loads in Tables 5-2 and 5-3 were corrected.

Table 5-2, Table 5-3, Figure 5-5, and Figure 5-6 were revised.

Section 6 – STA-2
The simulated inflow and outflow daily data sets were revised using the results of the BASERR1 simulation.

Spreadsheet “sta2_out tp.xls” was revised to correct errors in load calculations. Specifically, there were three problems: 1) Outflow loads were included on days when there were no outflows but there were inflow loads. 2) Outflow loads were not included on days when there were outflows but there were no inflow loads. 3) Some concentration calculations were inordinately high on some days when inflow loads/volumes were much higher than outflow loads. Outflow concentrations were capped at 200 ppb.

The text about the simulated bypass flows for STA-2 was revised to reflect the results of the BASERR1 simulation.

The spreadsheet formulas used to calculate some of the annual flows and loads in Tables 6-2 and 6-3 were corrected.

Table 6-2, Table 6-3, Figure 6-5, and Figure 6-6 were revised.

Section 7 – STA-3/4

The C-139 Basin runoff data used to develop the G-136 portion of the STA-3/4 inflow baseline data set presented in the May 2000 report was a result of best professional judgment of District staff and others at that time. We were aware that there were some deficiencies with the data, such as missing data, and data collection, measurement, and calculation errors. In a separate process, the C-139 Rulemaking effort, the C-139 runoff data set was being analyzed for possible correction, however, at the time of finalizing the May 2000 report, the data was still being analyzed. As a result of the C-139 Rulemaking effort, which included input from District staff, stakeholders, and other interested parties, a continuous daily data set was developed for the C-139 Basin runoff.

The G-136 portion of the revised historic C-139 Basin data set was used to develop the STA-3/4 baseline inflow data set. This data came from the Excel spreadsheet “c139_final_flows&loads.xls” dated March 8, 2001, prepared by W. Walker for the C-139 Rulemaking effort. The spreadsheet uses flow and phosphorus data from various sources, locations and structures. For a complete description of the data sources, please refer to the document titled “Final Report - Models for Tracking Runoff & Phosphorus Loads from the C139 Basin” dated November 17, 2000, by W. Walker.

A revised flow/concentration regression analysis was performed using the ten-year period WY 90-99 of the G-136 portion of the revised historic C-139 Basin data set. A seasonal (wet/dry) relationship was shown to improve the results, therefore a seasonal relationship was applied to the January 1965 to September 1978 portion of the 31-year simulated daily flow data set to develop daily concentrations for this portion of the data set. For the period October 1978 to December 1995, the G-136 daily flows, loads and concentrations were used unaltered from the spreadsheet “c139_final_flows&loads.xls”.

The simulated inflow and outflow daily data sets were also revised using the results of the BASERR1 simulation. The text about the simulated bypass flows for STA-2 was deleted to reflect the results of the BASERR1 simulation; the STA-2 bypass flows were minimal and were not added to the STA-3/4 baseline inflows in the May 2001 report.

Spreadsheet "sta34_out tp.xls" was revised to correct errors in load calculations. Specifically, there were three problems: 1) Outflow loads were included on days when there were no outflows but there were inflow loads. 2) Outflow loads were not included on days when there were outflows but there were no inflow loads. 3) Some concentration calculations were inordinately high on some days when inflow loads/volumes were much higher than outflow loads. Outflow concentrations were capped at 200 ppb.

The spreadsheet formulas used to calculate some of the annual flows and loads in Tables 7-3 and 7-4 were corrected.

Table 7-3, Table 7-4, Figure 7-8, and Figure 7-9 were revised.

Section 8 – STA-5

The C-139 Basin runoff data used to develop the L3 (G-88, G-898, and G-155) portion of the STA-5 inflow baseline data set presented in the May 2000 report was a result of best professional judgment of District staff and others at that time. We were aware that there were some deficiencies with the data, such as missing data, and data collection, measurement, and calculation errors. In a separate process, the C-139 Rulemaking effort, the C-139 runoff data set was being analyzed for possible correction, however, at the time of finalizing the May 2000 report, the data was still being analyzed. As a result of the C-139 Rulemaking effort, which included input from District staff, stakeholders, and other interested parties, a continuous daily data set was developed for the C-139 Basin runoff.

The L3 portion of the revised historic C-139 Basin data set was used to develop the STA-5 baseline inflow data set. This data came from the Excel spreadsheet "c139_final_flows&loads.xls" dated March 8, 2001, prepared by W. Walker for the C-139 Rulemaking effort. The spreadsheet uses flow and phosphorus data from various sources, locations and structures. For a complete description of the data sources, please refer to the document titled "Final Report - Models for Tracking Runoff & Phosphorus Loads from the C139 Basin" dated November 17, 2000, by W. Walker.

A revised flow/concentration regression analysis was performed using the ten-year period WY 90-99 of the L3 portion of the revised historic C-139 data set. A seasonal (wet/dry) relationship was shown to improve the results, therefore a seasonal relationship was applied to the January 1965 to September 1978 portion of the 31-year simulated daily flow data set to develop daily concentrations for this portion of the data set. For the period October 1978 to December 1995, the L3 daily flows and loads from the spreadsheet "c139_final_flows&loads.xls" were multiplied by 65%.

The daily phosphorus concentration values were used unaltered from the same spreadsheet.

The simulated inflow and outflow daily data sets were also revised using the results of the BASERR1 simulation.

A portion of the daily outflow data set was developed by applying a ratio of inflows to outflows to the daily inflows. For a complete description of the procedure used to develop the daily outflows, refer to the STA-5 section of the report.

Spreadsheet “sta5_out tp.xls” was also revised to correct errors in load calculations. Specifically, there were three problems: 1) Outflow loads were included on days when there were no outflows but there were inflow loads. 2) Outflow loads were not included on days when there were outflows but there were no inflow loads. 3) Some concentration calculations were inordinately high on some days when inflow loads/volumes were much higher than outflow loads. Outflow concentrations were capped at 200 ppb.

The spreadsheet formulas used to calculate some of the annual flows and loads in Tables 8-2 and 8-3 were corrected.

Table 8-1, Table 8-2, Table 8-3, Figure 8-2, Figure 8-3, Figure 8-4, Figure 8-5, and Figure 8-6 were revised.

<u>Section 9 – STA-6</u>
STA-6 Section 2 was added to the BASERR1 simulation, therefore, daily simulated inflow and outflow data sets were developed for STA-6 Sections 1 and 2 as a part of this revised report.

The L3 portion of the revised historic C-139 Basin data set was used to develop the STA-6 baseline inflow data set. This data came from the Excel spreadsheet “c139_final_flows&loads.xls” dated March 8, 2001, prepared by W. Walker for the C-139 Rulemaking effort. The spreadsheet uses flow and phosphorus data from various sources, locations and structures. For a complete description of the data sources, please refer to the document titled “Final Report - Models for Tracking Runoff & Phosphorus Loads from the C139 Basin” dated November 17, 2000, by W. Walker.

A revised flow/concentration regression analysis was performed using the ten-year period WY 90-99 of the L3 portion of the revised historic C-139 data set. A seasonal (wet/dry) relationship was shown to improve the results, therefore a seasonal relationship was applied to the January 1965 to September 1978 portion of the 31-year simulated daily flow data set to develop daily concentrations for this portion of the data set. For the period October 1978 to December 1995, the L3 daily flows and loads from the spreadsheet “c139_final_flows&loads.xls” were multiplied by 35%. The daily phosphorus concentration values were used unaltered from the same spreadsheet.

The simulated inflow and outflow daily data sets were revised using the results of the BASERR1 simulation.

Spreadsheet "sta6_out tp.xls" was revised to correct errors in load calculations. Specifically, there were three problems: 1) Outflow loads were included on days when there were no outflows but there were inflow loads. 2) Outflow loads were not included on days when there were outflows but there were no inflow loads. 3) Some concentration calculations were inordinately high on some days when inflow loads/volumes were much higher than outflow loads. Outflow concentrations were capped at 200 ppb.

The spreadsheet formulas used to calculate some of the annual flows and loads in Tables 9-2 and 9-3 were corrected.

Table 9-2, Table 9-3, Figure 9-5, and Figure 9-6 were revised.

Section 10 - Acme Basin B

Subsequent to the production of the May 2000 Baseline Data report, it was brought to our attention that there were some problems with the Acme Basin B historic flow data which was used to prepare the report. This data, which is collected and reported by Acme, then entered into DBHYDRO by District staff, contained some miscalculated pump flows during the years 1994 through 1997. In early 2001, the pump flow data was corrected, re-entered into DBHYDRO, then re-extracted for use in this revised report. A summary of the revised historic data set is presented in Appendix 10-1 of this report. The historic flow/concentration regression analyses were then redone for this basin. Although the t-test was met for ACME2 flows, it was not met for ACME1 flows, therefore, a regression equation was not used to calculate daily phosphorus concentrations. Similar to what was done in the May 2000 report, the flow-weighted mean concentration was applied to the simulated flows to develop the 31-year daily flow and water quality data set for Acme Basin B.

The simulated daily flow data set was revised using the results of the BASERR1 simulation.

The spreadsheet formulas used to calculate some of the annual flows and loads in Table 10-2 were corrected.

Table 10-1, Table 10-2, Figure 10-2, Figure 10-3, Figure 10-4, and Figure 10-5 were revised.

Section 11 – NSID Basin

The simulated daily flow data set was revised using the results of the BASERR1 simulation.

Text about the discrepancies in the historical and simulated flow values was deleted since the BASERR1 (the new SFWMM simulation) flows were more in line with historic flows. Because of this, the regression analysis between historic and simulated flows was no longer needed. Figure 11-5. Regression Analysis of Historical and Simulated Flows for NSID (1/85 to 12/95 Daily) was deleted.

The spreadsheet formulas used to calculate some of the annual flows and loads in Table 11-2 were corrected.

Figure 11-6 from the May 2000 report was renamed Figure 11-5.

Table 11-2 was revised. Note, scaling of the simulated flows was no longer needed. Figure 11-6 was revised.

Section 12 - North New River Canal Basin
The simulated daily flow data set was revised using the results of the BASERR1 simulation.

The spreadsheet formulas used to calculate some of the annual flows and loads in Table 12-2 were corrected.

Table 12-2 and Figure 12-2 were revised.

Section 13 – C-11West Basin
The simulated daily flow data set was revised using the results of the BASERR1 simulation.

The spreadsheet formulas used to calculate some of the annual flows and loads in Table 13-2 were corrected.

Table 13-2 and Figure 13-5 were revised.

Section 14 – L-28 Basin
The simulated daily flow data set was revised using the results of the BASERR1 simulation.

The spreadsheet formulas used to calculate some of the annual flows and loads in Table 14-2 were corrected.

Table 14-2 and Figure 14-5 were revised.

Section 15 – Feeder Canal Basin
No changes.

Section 16 – Summary

Table 16-1 was revised to reflect the revised flows and loads presented in the individual basin/STA sections of the report.

References

A reference to W. Walker's C-139 Basin Runoff report was added.

A reference to the 1997 Final Design Report for STA-5 by Burns & McDonnell was added.

## III. Appendices

Appendix 3-2 – SFWMM input parameters

*Basic Land Use* map revised to indicate ECP SFWMM V3.8.

*Grid Elevation* map revised to indicate ECP SFWMM V3.8 and Rotenberger topographic data was revised.

*Soil Infiltration Capacity* map was revised to indicate ECP SFWMM V3.8.

*Mean Annual Rainfall* map was revised to indicate ECP SFWMM V3.8.

*Average Daily Well Field Demands* map was revised to indicate ECP BASERR1

*Structure Capacities* table was revised to indicate ECP BASERR1 and structure data was revised as needed to reflect changes from ALT1 to BASERR1.

*Flow Distribution Diagram* was revised to indicate ECP BASERR1 and components were revised as needed to reflect changes from ALT1 to BASERR1.

Appendix 3-3 Figures (scatter plots)

The G-136 wet season and dry season plots were revised to reflect results of revised regression analysis performed for this May 2001 document. The G-155 scatter plots were deleted from the Appendices.

Appendix 8-1 – Historic Flows and Loads – C-139 Basin

Revised flow data was used to prepare the summary of the historic flows and loads for the ten-year period WY 90-99.

Appendix 10-1 – Historic Flows and Phosphorus – Acme Basin B

Revised flow data was used to prepare the summary of the historic flows and loads for the ten-year period WY 90-99.